JPRS-UEN-84-010

10 April 1984

USSR Report

ENERGY

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OIL AND GAS

EXPERIMENTAL STATION AT BEL'KOVSK MINE TO DERIVE GASOLINE FROM COAL

Moscow SOTSIALISTICHESKAYA INDUSTRIYA in Russian 17 Nov 83 p 4

[Article by V. Glebov: "Gasoline From Coal"]

[Text] "At the beginning of next year hundreds of cars in this country will be able to run on fuel obtained from ordinary coal," says the director of the Fuel Minerals Institute, Doctor of Technical Sciences A. Krichko. "But for that we must start up this unit."

It would be more accurate to call this experimental industrial unit for producing liquid fuel from brown coal a plant. It is being installed at the Bel'kovskaya mine in Tula Oblast. We are walking past the buildings of the unusual enterprise. Specialists of the Soyuzprommontazh Trust are now starting to fit them with equipment. Thanks to automation, no more than 200 people will service the unit. Two gasoline pumps, which will provide synthetic fuel to motor vehicles, were built directly on the enterprise's territory.

"In principle, methods of producing liquid fuel from coal have been around for a long time," the scientist continues. "What is gasoline? A mixture of hydrocarbons--compounds of carbon and hydrogen. But coal is mainly carbon. Thus, hydrogen must be added to it to convert it to gasoline. This process is called hydrogenation. But all attempts to realize it on a wide industrial scale hinged on the complexity of technology and high cost of the produced fuel."

The heroes of many ancient legends and tales, demonstrating their unusual strength, squeezed stones until water dripped from them. But how can one squeeze coal so that liquid motor fuel and not water flows from it?

This is not merely a figurative comparison. Foreign-produced methods of converting coal to gasoline are based primarily on the use of very high pressure--up to 600-700 atmospheres. Bulky, thick-walled equipment is needed in order to realize such processes. Much metal must be consumed in its production. High-alloy fusions, not the usual carbon steels, are needed for this.

"We are working with almost seven times less pressure," says A. Krichko, "therefore, our technology is almost half as expensive as analogous foreign technology. Why? Because of the pipelines, for example, which we managed

to make five times lighter. In addition, we were able to develop special catalysts which speed up the process and increase the effective yield of production."

Judging by the unit, the process of producing synthetic fuel is not as simple as it appears in theory. In order to convert coal to hydrocarbons, it is first crushed and treated with catalysts dissolved in water, then dried in vortex furnaces. Then it falls into a mill, where it is converted into "flour." Later it is processed by paste-forming mixers, then high-pressure pumps, which pump the prepared paste into special furnaces, where it will be heated and mixed with circulating hydrogen. Only after all this preliminary processing does the paste-like coal fall into reactors, where hydrogenation--saturation with hydrogen--occurs. This process of final conversion of coal to liquid fuel will occur at a temperature of about 425 degrees and pressure of 100 atmospheres.

"Of course, so far synthetic fuel is not very profitable: it takes 5 tons of coal to produce 1 ton of fuel," explains the scientist. "But we are already obliged to think about tomorrow. The earth's oil reserves are limited. But the capacity of our coal deposits is such that it will last hundreds of years. Synthetic fuel has an advantage over ordinary gasoline--it is ecologically purer: fewer exhaust gases form in it during operation. As for its cost, according to economists' predictions, the production of synthetic fuel will be profitable by the end of the next five-year plan."

The main blocks of the experimental industrial unit should start up at the end of this year.

12421
CSO: 1822/103

AIRCRAFT ENGINE TECHNOLOGY PROVIDES BASIS FOR NEW COMPRESSOR STATION ENGINES

Moscow VOZDUSHNYY TRANSPORT in Russian 8 Dec 83 p 3

[Interview with V. N. Orlov, doctor of technical sciences, one of the designers of the main gas-pumping unit, by A. Dushkina, VOZDUSHNYY TRANSPORT correspondent: "Aircraft Engines for a Super Gas Pipeline"]

[Text] "Dear Editors:

As we know, the Reagan Administration banned the sale to this country of gas-pumping units for the Urengoy-Pomary-Uzhgorod export gas pipeline. These units are produced not only in the United States but in other countries which produced these units under a U.S. license. I would like to know how domestic machinebuilding managed in a short time to organize its own production of them.

O. Lyakishev,
Co-Pilot, An-2 aircraft, Tula."

We will explain immediately: Based on a Tu-154 aircraft engine that had expended its flight usefulness, the collective headed by the general designer, Twice Hero of Socialist Labor and recipient of the Lenin Prize, Academician Nikolay Dmitriyevich Kuznetsov, in a very short time created a new powerful drive engine.

VOZDUSHNYY TRANSPORT correspondent, A. Dushkina, discusses the basic assembly of the gas-pumping unit with one of the authors of the drive engine, Doctor of Technical Sciences, V. N. Orlov.

[Orlov] Our design bureau specializes in developing aircraft engines for the Tu-154, Il-62 and Il-86 aircraft.

Having flown for a fixed length of time the expensive engine used to be melted down. This was done neither assiduously nor in the interest of the government. Then Nikolay Dmitriyevich Kuznetsov proposed using the aircraft engines which have out lived their usefulness aboard aircraft as power drives

at compressor stations. This was 10 years ago, in 1973. Work was performed according to the following scheme: an aircraft engine which has out lived its usefulness aboard an aircraft, that is, which has been written off, was used as a base.

Thus the first domestic aircraft drive engine with a capacity of 6,300 kw was developed on the base of an aircraft engine.

[Question] Vladimir Nikolayevich, the innovation's economic advantages are unquestionable--the engine is not written off as scrap metal but continues in service. I would like to know what are the other advantages of using gas-pumping aggregates over the existing compressor stations.

[Answer] There are many. Aircraft drive engines weigh 8-12 times less than stationary ones, and it is easy to transport them to remote regions of the nation. The work reliability of the aircraft engine in all weather conditions is proved by its use on aircraft.

The capability of units to work in a wide range of temperatures--from plus 50 to minus 50 degrees--opens the possibility of their use during severe winters and in desert and waterless locations.

[Question] It is known that your design bureau developed, within a short time, the new NK-16ST engine, which is successfully operating in the GPA-Ts-16 experimental gas-pumping unit.

[Answer] Yes, the plant was commissioned to build the new 16-MV NK-16ST drive engine on the base of an NK-8-2 aircraft engine, installed on the Tu-154 aircraft. The engine was built in a record short time. It passed the state tests in April 1982, and in June the first domestic experimental-industrial gas-pumping station was built and put on line.

All engines passed the control-delivery tests and were sent to the customers.

[Question] Vladimir Nikolayevich, inasmuch as the GPA-Ts-16 gas-pumping units are only one of the links of the large complex program of gas pipeline construction, I would like to know how the units will be distributed and how they will operate on the Urengoy-Pomary-Uzhgorod line.

[Answer] Compressor stations are being built all along the gas pipeline at distances of 100-130 km from each other. In order to assure the gas pipeline's effective operation, several gas-turbine pumping units will be built at each station.

Operating since the middle of last year on the active Urengoy-Tsentr line and circular pipeline, the unit proved itself highly reliable with high operational qualities.

Assembly of the Urengoy-Novopskov gas pipeline was completed at the Syzran compressor station. Our GPA-Ts-16 units with NK-16ST engines were installed at this station, which will be the leader.

The planned quantity of NK-16ST engines has already been delivered for this year. The Urengoy-Pomary-Uzhgorod gas pipeline main was built ahead of schedule and will undoubtedly come on stream at the planned time.

This will be another serious political and economic blow to the policies of the Reagan Administration, which desired by its actions to put us in a difficult situation.

[Question] Where else may aircraft drive engines be used?

[Answer] With some modification they may be used to heat homes and hotbeds, and even, if you wish, to cultivate gardens in permafrost.

Various kinds of heat transfer units, in which water will be heated to a certain temperature, may be installed for this purpose in the engine's exhaust stream. It is also possible to build an autonomous electric power plant operating by steam turbine that will utilize the heat of exhaust gases. If the gas-pumping units are located in remote and unpopulated areas and are not near a settlement (for example, with the watch method of servicing compressor stations), then it is possible to increase the drive engine's capacity and correspondingly its efficiency factor by regeneration of exhaust heat.

Now our collective, headed by Academician N. D. Kuznetsov, is teaching the "earthly profession" to another aircraft engine with a potential capacity of 25,000 kw.

The Soviet Union is the only highly developed nation in the world which satisfies its demands for fuel and energy with its own resources. This determines the reality of our programs, and the scale and pace of development of the gas industry and technology.

12421
CSO: 1822/103

UDC 550.83/84(477)

LOCATIONS, METHODS FOR UKRAINE'S FUTURE OIL, GAS EXPLORATION DESCRIBED

Kiev NEFTYANAYA I GAZOVAYA PROMYSHLENNOST' in Russian No 4, Oct-Dec 83 pp 10-13]

[Article by A. M. Paliy of UkSSR Ministry of Geology: "The Main Directions of Geological Exploration for Oil and Gas in the Ukrainian SSR"]

[Text] In less than three years of the 11th Five Year Plan that have elapsed, UkSSR Ministry of Geology geological-exploration organizations have discovered 22 oil and gas fields, 14 of them in the Dnepr-Donetsk Basin. The reserves of 10 fields have been confirmed by USSR GKZ [State Commission on Mineral Resources Reserves], and 4 field have been transferred to development. For 15 years now the republic's geological explorers have been finding about the same number of fields, and a relative stability has been achieved in hydrocarbon inc.ease per exploration hole, which is the most objective indicator of the effectiveness of operations where there has been a high degree of study and the depths of deposition of the promising complexes are great. All this confirms the correctness of the directions for geological exploration that have been chosen for the current five-year plan.

In the Dnepr-Donetsk Basin, in accordance with UkrNIGRI [Ukrainian Scientific-Research Institute for Geological Exploration] recommendations, the main amounts of deep drilling have been aimed at prospecting for and exploring gas and oil deposits in Lower Carboniferous sediments. In so doing, the main attention has been paid to evaluating the petroliferousness of large swells and depression zones and their slopes. Three new gas-recovery regions have been prepared for development: the Yablunovskiy, Kotelevsko-Berezovskiy and Abazovsko-Sementsovskiy areas. Prospects for the Solokhovsko-Oposhnyanskiy and Glinskiy-Rozbyshevskiy swells have been expanded through newly discovered deposits of gas in the Lower Carboniferous at depths of 3,800-5,500 meters in the Matveyevskiy, Zapadno-Solokhovskiy and Kharkovtsevskiy areas. In the northwestern zone, at the base of the Dnepr-Donetsk Basin, productive horizons have been identified in the Lower Carboniferous in the Andreyashevskiy, Voloshkovskiy, Yarmolintsevskiy, Korzhevskiy and Gubskiy areas. The prospects for the Serpukhov, Viseyan and Tournaisian stages of the Lower Carboniferous, at structures that have been explored within the south of the Visokopolskiy bench (the Sakhalinsko-Belousovskiy region) and within the Upper Viseyan sediments within the southwestern zone at the foot of the basin, at depths of 4,500-6,000 meters, have been given a high appraisal.

A new direction for operations--the prospecting of Lower Carboniferous formations on the slopes of depressions (discovery of the Voloshkovskoye and Zhitnikovskoye fields) at depths of 4,000-4,500 meters--is being confirmed. Thus, the main result of operations of recent years in the Dnepr-Donetsk Basin is the appearance at great depths (more than 4,000 meters), in the Lower Carboniferous, of seven gas and oil recovery regions, with the overall gas reserves assessed as being equal to the Shebelinskoye field.

In the republic's western oblasts, new deposits of oil and gas have been discovered basically in traditional areas (the Sarmat-Tortonskoye formations of the Bil'che-Volitskoye and Paleogene formations of the Borislavskiy and Pokutskiy zones). An important result was the discovery of gas fields at Volyn-Podoliya (the Lokachinskoye field in Devonian sediments) and in the Transcarpathian trough (the Solotvinskoye field, in formations of the Nevoselitskiy suite of the Neogene).

To the south in the republic, commercial flows and direct signs of petroliferousness have been obtained at the bottom of the Maykop and in Paleogene and Upper Cretaceous sediments (the Kerch Peninsula), and deposits of light oil have been discovered in the Devonian at the Saratskiy area (western Black Sea region); in this same region, new targets for prospecting have been identified in the basal terrigenic series of the Middle Jurassic and in carbonates of the Upper Jurassic.

The overall result of geological exploration was fulfillment of the plan for increasing the republic's oil and gas reserves. At the same time, negative phenomena also were observed. They include, in particular, a reduction in the effectiveness of geological exploration in the Dnepr-Donetsk Basin. Since the Lower Permian riddle has basically been depleted and lost its former significance, the gas and oil reserves have been made good mainly by the discovery of small fields in the Lower Carboniferous complex. While, during the 9th and 10th Five-Year Plans, the main increases in gas and oil reserves and in oil and gas recovery were provided through the exploration of high-amplitude traps with deposits in massive formations that have an extremely high concentration of reserves per square kilometer of area in Lower Permian-Upper Carboniferous sediments, during the 11th Five-Year Plan, conversion to prospecting for hydrocarbon deposits, which is being conducted primarily in the Lower Carboniferous and is characterized by a low degree of concentrations thereof, has led to a reduction in geological-exploration effectiveness. Aside from the scattering of reserves at great depths in the Lower Carboniferous, the involvement in development of gas deposits that have an increased content of condensate, whose recovery requires complicated development technology, is exerting an increasingly great influence on recovery.

The massive conversion to prospecting for gas and oil deposits in Lower Carboniferous sediments of the Dnepr-Donetsk Basin which have been scattered by virtue of objective natural causes into small formations, a high level and authenticity in scientific forecasting of promise of the areas is required, as is the compilation of local, large-scale forecast maps of the reservoir, the cap rock, and other criteria for petroliferousness.

This relates equally to the Ciscarpathian and Black Sea-Crimea petroliferous regions, where geological-exploration effectiveness is not high.

The principal media for raising the effectiveness of prospecting for oil and gas are well known: a proven evaluation of forecast oil and gas resources, on the basis of which high-priority regions for the operations are defined; the conduct of a set of geological and geophysical operations that involve forecasting, prospecting for and preparing structural traps for prospecting drilling; a rational methodology for exploring hydrocarbon deposits that have been discovered; and highly skilled computation of the parameters for preparing the deposits for development.

Increased demands are made on scientific-research organizations in regard to validating new estimates of forecast resources, differentiated by separate stratigraphic zone or region that is petroliferous or promising. In the Dnepr-Donetsk Basin, calculations for D_1 and D_2 resources must be made separately for the subsalt and the intrasalt Devonian, for the Tournaisian-Upper Devonian terrigenous carbonate complex, and for the Lower and Upper Visean, the Serpukhov, Bashkirian and Moscovian stages of the Middle Carboniferous, the Lower Permian and the Upper Carboniferous.

Similarly, the resources of petroliferous complexes of the republic's western regions should be computed in similar fashion: in the Ciscarpathian troughs for Sarmatian, Badenian, Tortonian, Oligocene, Paleocene, Eocene and Cretaceous formations; at the Volyn-Podoliya for the Devonian, Silurian and Cambrian; and in the Transcarpathian trough for the Neogene supersalt and subsalt and for the Paleogene-Cretaceous foundation of the trough. To the republic's south, an evaluation should be made of forecast resources for the Neogene, Oligocene, Paleocene, the Upper and Lower Cretaceous, the Jurassic and Permian-Triassic, as well as the Paleozoic.

A high level of scientific substantiation of forecast resources will permit ways for finding new large and medium-sized fields to be planned more reliably. According to the data of the mathematical-geology method, fields that are 5-fold greater (according to B. I. Kabyshev) or 2.2-fold greater (according to V. I. Kaledina and V. A. Nagornyy) or 2.3-fold greater (according to B. I. Yarosh) than have been established up to the present can be discovered in the Dnepr-Donetsk Basin. These forecasts testify to good prospects for discovering new oil and gas reserves.

The chief problem consists in finding deposits with a high concentration of reserves. According to world statistical data and the results of research conducted in the Ukraine, such hydrocarbon accumulations are confined, as a rule, to angular stratigraphic nonconformities of oil and gas accumulating strata and to carbonate formations covered over by poorly permeable horizons. In the Dnepr-Donetsk Basin such fields can be forecast at the level of a nonconformity of the Tournaisian-Devonian in buried traps that are adjacent to the periphery of salt-dome swells of the Glinsko-Kharkovtsevskoye, Zapadno-Solokhovsko-Matveyevskoye, the northern slope of the Pozdnyakovsko-Isachkovsko-Radchenkovskoye, and on the wings and periclines of the Bel'skiy, Shebelinskiy and the Kachanovskiy structures.

Prospecting and evaluation of petroliferous carbonate benches (buried remnants) in Tournaisian-Viseyan sediments also are promising. The 1983 discovery in the southern side zone of the Ignatovskoye field, which, although it is small, has an important prospecting criteria, can be confirmation of this. Similar remnants in the southern side zone will probably be found in the area between the Sagaydakskoye and Reshetnyakovskoye fields, and in a section of the Novogrigoryevskoye field at the Orel bench.

Such carbonate benches, while relatively small in area, can be several hundred meters or more in thickness. On being exposed to weathering for a long time, the limestones (reef type) become exceptionally capacious and can accumulate substantial hydrocarbon accumulations under favorable conditions. Obviously, in this regard, the nature of the large Buchkovskiy gravity low, which the Dnepr-Petrovsk geophysical expedition (under V. S. Popovich) found in an area to the northeast of the Bogatoyskoye field, should be evaluated.

Because of new directions in addition to those indicated above, it is desirable to engage objectively in evaluating the promise of petroliferousness of the carbonate reservoirs of the Lower Permian in areas where bulges in their thickness are forecast in the Orichkovskaya depression and at the southern termination of the Vysokopolskiy bench, and on the fringes of salt-dome swells of the southeastern Dnepr-Donetsk Basin. Appraisal drilling and seismic exploration must be expanded in order to evaluate the petroliferousness of carbonate sediments of the Upper Jurassic of the Pridobrudzhinsk trough and the Paleogene of the Kerch, and also of the Silurian at Volyn-Podoliya.

It stands to reason that the potential for finding new directions for prospecting are not exhausted in regions where work traditionally is done to find oil and gas fields in the Carboniferous and Permian of the Dnepr-Donetsk Basin in the Paleogene and Neogene of the Ciscarpathian and Indolo-Kuban troughs.

The preparation of a reliable morphological base for traps by geological and geophysical methods is the next important reserve for increasing operating effectiveness. At present, the number of prepared targets guarantees no more than a 1.5-multiple of the volume of deep drilling. In order to get a multiple of 2 to 2.5 for the drilling, the appropriate subunits of associations and of UkrNIGRI and of geological sections of expeditions must take part in preparing the substantiation for organizing deep drilling, which is equated to the official description for the structure.

Unfortunately, the geologists of the oil and gas exploration expeditions are not sufficiently occupied with forecasting new targets for prospecting, and they spend too much time on the current servicing of holes.

The main task of geophysical organizations in regard to raising quality in the preparation of a morphological base is to increase the density of the seismic traverse grid to 2 kilometers per square kilometer of area (as has been adopted in the Urals-Volga province), to increase the multiplicity of observations to 24-48, and to optimize observation systems and the magnitudes of charges as applicable to the various regions and stratigraphic complexes. When preparing complicated structural forms, seismic exploration, gravimetry, and electrical

and seismic exploration should be used in integrated fashion. The introduction of developments in regard to searches for nonanticlinal traps and to forecasting geological sections should be accelerated.

Success in operation at the prospecting stage is determined to a great extent by the level of zonal and local forecasting of an area's petroliferousness. Currently existing directives on introducing these forecasts still are far from perfect. It seems that the local forecast, which includes construction of a model of the future deposit (a reservoir, a cap rock and a false cap) at the drilling-planning stage should have a sound basis in the form of a collection of various geophysical, lithologico-facial, geochemical, hydrodynamic, AVPD [anomalously high formation pressure] and other maps and logs. UkrNIGRI's task is to provide oil and gas exploration organizations with this reliable information in order to substantiate searches for oil and gas deposits in drafts of the local prognoses.

An important factor in increasing the work's economic effectiveness is optimization of the exploration process based upon the rational siting of holes, which will enable maximal information to be obtained, especially when exploring for gas deposits at depths that exceed 5,000 meters. UkrNIGRI and appropriate subunits of the associations should dispense with the traditional methods and, by means of computers, simulate the deposit being explored, in order to compile special-purpose maps of the formations' parameters and to decide the optimal number of deep wells. Timely and thorough analysis of the exploration, strict observance of the principle of the sequence of sinking wells at complicated traps, maximal use of OPE information and the use of remote methods for evaluating gas-pool outlines will help to raise the productivity coefficient of exploration wells by at least 38-40 percent.

Still another reserve for reducing the cost of exploring fields is the high information content of the geological sections that are found when deep holes are being sunk. An inadequacy of this information can lead to the bypassing of oil and gas horizons.

The content of the direct methods for evaluating formations, particularly OPN and drill-stem testing, must be expanded. These direct methods for evaluating a section are concentrated right now in geophysical organizations. Doubts about interpreting the information obtained about horizons in a promissing section and a lack of convincing proof of nonproductivity are sufficient cause to require sampling of the target. It is desirable also to conduct repeat geophysical studies in cased wells that are being tested.

Research conducted at several fields, including the Zapadno-Krestishchenskoye by this method of INNK [pulsed neutron-neutron logging] have enabled separated zones to be established and the effective thickness of gas-bearing formations to be determined unambiguously.

Active work by geological-prospecting and scientific-research organizations will help to speed up the discovery of new fields, raise the trustworthiness of oil and gas reserves, and reduce expenditures on preparing them for integrated development by oil and gas recovering enterprises.

11409
CSO: 1822/144

SYNOPSES OF ARTICLES IN NEFTYANAYA I GAZOVAYA PROMYSHLENNOST, OCT-DEC 1983

Kiev NEFTYANAYA I GAZOVAYA PROMYSHLENNOST' in Russian No 4, Oct-Dec 83 pp 55-56

UDC 553.981/982(447.8)

PRODUCTIVE HORIZONS OF UPPER CRETACEOUS SEDIMENTS OF CARPATHIA'S SKIBOVAYA ZONE

[Synopsis of article by G. F. Geletiy, M. I. Shevchuk and M. M. Chayka in NEFTYANAYA I GAZOVAYA PROMYSHLENNOST', No 4, Oct-Dec 83 pp 16-18]

[Text] The field-geology characteristics of Upper Cretaceous deposits of the Carpathians' Skibovaya zone are examined in the example of the Miriam oil deposit, which is confined to the Opakov slice of the Orovskaya Skiba. The Yamnenskoye and Upper Stryyskoye sediments have been correlated. The geological factors of the Opakov slice, which are favorable for commercial accumulations of oil in shallow horizons and outside previously explored areas, are described. The consistencies displayed in the upper part of the Upper Stryyskoye sediments testify to their promise throughout the whole Borislavskoye oilfield region. 2 illustrations.

UDC 553.98.061.4:552.54:550.832

EVALUATION OF RESERVOIR SATURATION BY RADIOMETRY, ELECTROMETRY OF HOLES

[Synopsis of article by Ye. M. Dovzhok, O. N. Kis' and N. N. Gun'ka in NEFTYANAYA I GAZOVAYA PROMYSHLENNOST', No 4, Oct-Dec 83, pp 18-20]

[Text] The methodology for categorizing formations by the nature of the saturation, taking into account homogeneity in terms of porosity and degree of saturation when they are flooded by fresh water injected for PPD [maintenance of formation pressure] purposes, is cited.

Factors that affect change in the volumetric content of chlorine in a formation flooded with fresh water are examined.

Theoretical functions that determine the tie between the flow-rate and capacity of formations and their electrical and neutron characteristics are computed.

Practical examples of implementing the methodology at the fields are indicated. 2 illustrations, 4 references.

UDC 550.83/84

DEGREE OF STUDY OF PEREKOPOVSKOYE FIELD

[Synopsis of article by N. Ya. Baranovskaya, I. G. Lata, V. P. Pentsak and N. S. Predtechenskaya in NEFTYANAYA I GAZOVAYA PROMYSHLENNOST', No 4, Oct-Dec 83, pp 13-15]

[Text] A current evaluation of the degree of study of the Perekopovskoye oil, gas and condensate field and of the geological and economic effectiveness of the prospecting and exploration performed in its area was made with methodological measures developed by Ukr NIGRI [Ukrainian Scientific-Research Institute for Geological Exploration]. By comparing the actual magnitudes of the relative errors in determining the area, the effective oil and gas saturation capacity, and the reserves with the requirements as to magnitudes of error which were worked out for DDV [Dnepr-Donetsk Basin] fields, a rational boundary for exploring it was established. 1 illustration, 1 table, 3 references.

UDC 622.245.422(088.8)

STABILIZING HOLES WITH LIGHTWEIGHT MUDS IN 'ANPD' [ANOMALOUSLY LOW FORMATION PRESSURE] ZONES

[Synopsis of article by G. D. Dibrov, A. S. Belikov and V. G. Mosiyenko in NEFTYANAYA I GAZOVAYA PROMYSHLENNOST', No 4, Oct-Dec 83, pp 28-30]

[Text] The results of studies of lightweight muds based upon direct emulsions and of industrial-test experiments with emulsion-type cement muds are cited. Recommendations on their application are given. 2 tables, 2 references.

UDC 553.982:553.046(477.5)

METHODOLOGY FOR COMPUTING GROWTH OF OIL, GAS RESERVES

[Synopsis of article by V. M. Zav'yalov in NEFTYANAYA I GAZOVAYA PROMYSHLENNOST', No 4, Oct-Dec 83, pp 24-26]

[Text] Determination of the current increase in commercial oil and gas reserves should be based upon C_2 category reserves of explored fields, and the possibility of increasing reserves through the discovery of new oil and gas areas should also be considered. During long-range planning for increase in hydrocarbon reserves, where the pace and amount of prospecting and exploration have been established, one should be guided by the number of fields expected to be discovered and by the average amounts of their hydrocarbon reserves, differentiated by individual petroliferous complex and region. Further replenishment of commercial oil and gas reserves in the Dnepr-Donetsk Basin is linked basically with exploration of deep-lying sediments of the lower Carboniferous. 4 references.

UDC 550.83:551.24

TRANSFORMATION OF SEISMIC TIME CROSS-SECTIONS INTO PALEOTIME CROSS-SECTIONS

[Synopsis of article by R. V. Gerasimovich in NEFTYANAYA I GAZOVAYA PROMYSHLENNOST', No 4, Oct-Dec 83, p 26]

[Text] A method for transforming seismic time cross-sections into paleotime cross-sections, which is carried out on a computer, is proposed. The set of paleotime cross-sections will enable discovery of the characteristic features of an area's geological development, which will allow theoretically valid prospecting for nonanticlinal hydrocarbon traps to be conducted.

UDC 622.242.6

A UNIFORMLY LOADED SEAL FOR PISTON ROD OF U8-6M SLUSH PUMPS

[Synopsis of article by S. P. Lishchinskiy, A. A. Mardakhayev and V. M. Lakhnyuk in NEFTYANAYA I GAZOVAYA PROMYSHLENNOST', No 4, Oct-Dec 83, p 31]

[Text] The causes of short service life of the seals of slush-pump piston rods are analyzed. The design of a new seal for the piston rod of the UShN-80 is described. The results of field tests of the new seal, which testify to its high efficiency and reliability, are cited. 1 table, 1 illustration.

UDC 661.185.004.14:622.279(477)

FOAM SUPPRESSION, REGENERATION OF SPENT 'PAV' FLUIDS

[Synopsis of article by M. Kondrat, M. M. Biletskiy, M. P. Yatskiv et al, in NEFTYANAYA I GAZOVAYA PROMYSHLENNOST', No 4, Oct-Dec 83, pp 31-33]

[Text] A scheme for an industrial-test installation is described and the results of tests of foam-suppression processes in the system of preparing gas and regenerating spent PAV [surfactant] fluids, as applicable to the injection of PAV's into a well in order to intensify the removal of water, are cited. The basic potential of the fight against foam formation in the system for preparing gas and for regenerating spent PAV fluids with a view to repeat use of the foam-forming reactants is indicated. 1 illustration, 2 references.

UDC 620.197.5

TEST OF OPERATION OF LENGTHY ROD-SHAPED MAGNESIUM PROTECTORS

[Synopsis of article by B. S. Smirnov in NEFTYANAYA I GAZOVAYA PROMYSHLENNOST', No 4, Oct-Dec 83, pp 37-39]

[Text] Some results of operating lengthy magnesium structure for protecting gas pipelines from corrosion are cited. The data obtained testify to the desirability of using ribbon-shaped protectors for anticorrosion protection. 2 illustrations.

UDC 622.276.031.011.43:53.082.2(477.86)

METHODOLOGY FOR DETERMINING FILTRATION PARAMETERS OF FORMATION FLUIDS

[Synopsis of article by I. T. Mikitko and L. G. Ostryanskaya in NEFTEYANAYA I GAZOVAYA PROMYSHLENNOST', No 4, Oct-Dec 83, pp 34-35]

[Text] A methodology for determining the filtration characteristics of formation fluids in terms of the actual indicators for developing the field is set forth and the results thereof are cited. It is shown that the formation-fluid filtration parameters that are obtained, taking oilfield conditions into account, differ considerably from the well-known parameters that are used in some works about evaluation of the effectiveness of developing waterflooding of deposits during a depletion situation. The proposed methodology has been used for oil deposits and fields that are in a late stage and are being operated on a combination drive and artificial waterdrive. 1 illustration, 5 references.

UDC 622.692.4.07:338.984:001.89

MANIPULATION OF RESOURCES OF A FLOW-LINE GROUP FOR BUILDING LINE FACILITIES

[Synopsis of article by L. M. Unigovskiy and V. M. Topchiy in NEFTYANAYA I GAZOVAYA PROMYSHLENNOST', No 4, Oct-Dec 83, pp 39-41]

[Text] An algorithm for optimal manipulation of the resources within a flow-line construction group that builds line facilities, based upon the processing of incoming controller-post information and data about the natural and climatic conditions of the pipeline right-of-way. 3 tables, 2 references.

UDC 665.51.074.3:097

THERMOCATALYTIC STABILIZATION OF OIL-REFINERY GAS COMPOSITION

[Synopsis of article by N. A. Kochergin, V. V. Chastukhin and V. I. Grechko in NEFTYANAYA I GAZOVAYA PROMYSHLENNOST', No 4, Oct-Dec 83, pp 42-45]

[Text] An experimental installation for thermocatalytic stabilization of the composition of fuel gas of the Kremenchug NP? [Oil Refinery] is described and test data are cited. An experimental conversion catalyst that possesses increased activity in comparison with existing industrial catalysts was studied. The possibility of thermocatalytic stabilization of oil-refinery gases is shown, the appropriate catalysts are chosen, and the main parameters for conducting the process are defined. 3 illustrations, 1 table, 3 references.

UDC 665.55

PHYSICAL, CHEMICAL ANALYSIS OF MIXED 'NMP+DEG' SOLVENT

[Synopsis of article by Yu. A. Rayevskiy and M. M. Prokopets in NEFTYANAYA I GAZOVAYA PROMYSHLENNOST', No 4, Oct-Dec 83, pp 49-51]

[Text] The results of a study of the physical and chemical characteristics of binary systems of diethylene glycol-N-methylpyrrolidon, dimethylsulfoxide and furfural are cited. The existence of a deviation of properties from the additivity of systems that contain equimolar amounts of components in binary solvents is indicated. In the example of the solvent NMP+DEG, a deviation of physical-chemistry and extraction properties of mixed solvents in the area of the concentration of components that corresponds to the maximum intermolecular reaction is noted. 3 illustrations, 5 references.

UDC 6P7.43+6P7.50

GRAPHIC METHOD FOR CALCULATING EQUILIBRIUM COMPOSITION OF A CONVERSION GAS

[Synopsis of article by V. V. Chastukhin in NEFTYANAYA I GAZOVAYA, No 4, Oct-Dec 83, pp 47-49]

[Text] Existing methods for determining the equilibrium content of a conversion gas for hydrocarbon raw material are analyzed and a graphic method for computation is proposed that will enable the equilibrium content of a gas for low-temperature hydrocarbon conversion to be found rapidly and with a degree of precision adequate for practical calculations. 1 illustration, 1 table, 3 references.

11409
CSO: 1822/144

BRIEFS

GASOLINE FROM MAZUT--Pavlodar--An important step towards introduction of wastefree technology was taken at the local oil refinery. Capacities for the primary sublimation of mazut--the main waste product of oil refining--will be put on line here. Builders and fitters succeeded in putting into operation a powerful installation thanks to introduction of the multi-skill contract method. Concentrating a large amount of technology at the construction site, the sub-contractors completed the main ground work. Then tall columns were erected in the work area by cranes and special winches. This method still proved effective because assembly operations were performed with high quality. The station is operating smoothly with no malfunctions. All other projects included in the second stage of the enterprise are also being built by the multiple skills contract method. They will come on line stage-by-stage before the end of this year. The coming on line of the entire mazut deep processing complex will increase by a fourth the enterprise's production of gasoline and kerosene. All mazut which is now burned off in the furnaces of electric power plants will be refined into light fuel, which will considerably lower the cost of its production. [Text] [Alma-Ata KAZAKHSTANSKAYA PRAVDA in Russian 17 Nov 83 p 2] 12421

NEW TANKER FOR CASPIAN FLEET--Baku--Sergey Kirov is the name of a new pilot tanker from the series of large-capacity oil carriers. Leaving the berths of a Romanian shipbuilding plant, it crossed the Black Sea, then arrived via the Volga-Don canal and Volga at its assigned port--Baku. Reinforcement of the Caspian Shipping Line's tanker fleet resulted from the rapid development of Azerbaijan's oil-refining industry and the coming on stream of the operating parts of the pipeline main, along which West Siberian oil flows to the republic's capital. [Text] [Moscow SEL'SKAYA ZHIZN' in Russian 29 Nov 83 p 1] 12421

NEW BRAND OF DIESEL GENERATOR--Nikolayevskaya Oblast--Next year the Pervomayskiy Machinebuilding Plant imeni 25 October will begin producing a new brand of diesel generator. Production of a control batch of machines producing current on the base of a 1,200-hp capacity diesel is in full swing at the plant. Plant designers developed the new aggregate. As the interdepartmental commission noted, its parameters correspond to the best domestic and foreign models and may be recommended for conferment of the highest quality category. The diesel generator is economical, may operate on heavy and low-grade fuel and possesses a high motor capacity. [By A. Kuznetsov] [Text] [Moscow SOTSIALISTICHESKAYA INDUSTRIYA in Russian 11 Nov 83 p 2] 12421

TENTH GAS-PROCESSING STATION--Novyy Urengoy (Tyumen Oblast) (TASS)--The new comprehensive gas-processing station No 10 recovered raw materials from the depths of the Urengoy deposit. Testing of the technical equipment has begun. The station will dry, purify and send gas to the pipeline mains. In spite of the harsh conditions of the polar tundra, the builders erected the station in half a year instead of the planned time of over 2 years. The block method helped the Siberians considerably shorten assembly time. Complex technical equipment was first collected into compact sets at Tyumen plants, then delivered to the construction site, where they were left for assembly. Startup of the 10th station will make it possible to increase significantly the delivery of natural gas from northern West Siberia. [Text] [Moscow SOTSIALISTICHESKAYA INDUSTRIYA in Russian 1 Dec 83 p 1] 12421

GAS TURBINE MACHINING UNITS--A batch of unique devices, developed by workers of the Special Design Development and Engineering Buro of Electric Processing, has been produced. They are designed for electrochemical machining of gas turbine blades. Using the devices, it is possible to machine parts from two sides simultaneously. The new device has better technical characteristics compared to other analogous devices, which considerably increases machining accuracy. The number of essential operations is reduced: after being stamped the blades are immediately polished. All operations, except loading, are executed automatically. The new model is easier to operate--its consoles are more efficiently located. The device makes it possible to machine other variously shaped parts with lengths up to 250 mm. [By A. Kuznetsova] [Text] [Leningrad LENINGRADSKAYA PRAVDA in Russian 5 Nov 83 p 1] 12421

HORIZONTAL GAS FORMATIONS--(TurkmenINFORM)--A gas deposit was discovered in the area of Chemenabid in southern Turkmenistan. There was a large influx of fuel from the very first exploratory well drilled here to a depth of 3 km. The influx was not from a fold structure, but from an almost horizontal stratum. "Exploration of these horizons," said the chief geologist of the Turkmen SSR Geology Administration and recipient of the 1983 USSR State Prize, M. Mirzakhanov, "is a new direction of geological work in the republic. It began with the finding of the Dovletabad-Donmez gas condensate field, for the discovery and rapid and highly effective prospecting of which a large group of specialists received the 1983 USSR State Prize. We were the first to discover and define the new type of deposit--gas accumulation not in the usual fold structures, but in a gently dipping stratum, thoroughly sealed with nonporous rock. The opportunity arose to reevaluate the huge territory's oil and gas prospects. We are now attempting to apply the same highly effective exploratory method used in Dovletabad-Donmez in the Chemenabid area. Due to the increase of distance between prospecting wells, which is possible on a linearly extended deposit, we have reduced the drilling volume here by 25 drill shafts." [Text] [Ashkhabad TURKMENSKAYA ISKRA in Russian 30 Nov 83 p 2] 12421

PLANNED WELLS COMPLETED--Kiev--The collective of the Ukrgazprom Association completed early the 3-year plan for construction and drilling of gas wells. The deep-drilling expedition of the Krestishchensk Drilling Administration,

working in the Urengoy gas condensate field in the harsh conditions of northern Tyumen, made a substantial contribution to this success. The drilling teams headed by recipient of the USSR State Prize and Order of the Labor Red Banner, I. Rybchin, Hero of Socialist Labor, D. Sayenko, V. Falaleyev and V. Fedyuk lead in drilling competition. Almost all of the association's drilling and derrick-building collectives work according to the brigade contract method. Before the end of the year another eight wells will be turned over to gas production workers. [By L. Zorin] [Text] [Moscow SOTSIALISTICHESKAYA INDUSTRIYA in Russian 30 Nov 83 p 1] 12421

CSO: 1822/103

UDC: [622.6+620.9] (100 SEV)

DEVELOPMENT OF CEMA FUEL AND ENERGY COMPLEX SURVEYED

Moscow UGOL' in Russian No 1, Jan 84 pp 13-15

[Article by V. I. Voloshin, engineer, IEMSS AN SSSR [Economics of the World Socialist System Institute, USSR Academy of Sciences]: "Prospects for the Development of the Fuel and Energy Complex of CEMA Countries"]

[Text] The intensification of production and the changes in the world energy balance make it very important to improve CEMA countries' energy supplies through upgrading the structure of the fuel and energy complex (FEC).

Problems in such upgrading of the FEC have had a central place in the long term targeted program for cooperation (LTTPC) for various types of energy resources ratified at the 32nd Session of CEMA. They are constantly in the view of communist and workers' parties in the countries of the socialist community.

Making use of the advantages of a planned economy and expanding the possibilities for socialist economic integration, the countries in the socialist community are successfully solving FEC sector developmental problems involving energy supplies to the dynamically growing economies of CEMA countries.

As a rule, the fuel and energy sectors of CEMA countries are developing at faster rates than in capitalist countries. Between 1960 and 1980 the share of CEMA countries in total world output of energy resources (calculated in standard fuel units) increased from 21 to 25 percent, while the corresponding indicator for EEC countries declined from 11 to 6 percent.

During this time the total production of energy resources in CEMA countries increased 2.4 fold, while oil and gas extraction increased 3,8 and 8.3 fold respectively. (See Table 1.).

Table 1.

Energy source	1960	1970	1980
Coal (Including anthracite)(mil. tons)	496.3	613.1	726.0
Brown coal and lignite (mil.tons)	469.9	588.9	633.4
Oil* (mil tons)	160.9	368.9	617.2
Natural (and associated gas (bi. m^3)	54.5	218.7	452.0
Electricity (bil. kWh)	406.1	992.9	1,726.1

*And gas condensate

There has been especially rapid expansion in the fuel and energy base of the USSR, which produces about 80 percent of all energy resources in CEMA countries. The USSR is dynamically developing all sectors of its fuel and energy complex. This will make it possible for the Soviet Union not only to successfully expand a diversified industrial complex within the framework of its national economy, but also to export fuel and electrical energy.

Between 1970 and 1980 energy exports from the Soviet Union increased approximately 2 fold, reaching 317 million tons of standard fuel, of which about 190 million tons were sent to CEMA countries.

Natural factors play a big role in the formation of the FEC and in the fuel and energy supplies of CEMA countries (structure, volume, geological conditions of occurrence). In Poland, the GDR, Czechoslovakia, Bulgaria and Mongolia coal accounts for 98-99 percent of fossil fuel reserves, while in Hungary and Romania the figures are 70 and 50 percent respectively. In the GDR, Bulgaria and Hungary coal reserves are mainly brown coal and lignite, in Poland, anthracite and lignite, while in Czechoslovakia and Romania, anthracite, brown coal and lignite.

The hydroelectric potential of the USSR is estimated at 1,095 billion kWh annually, which is about 12 percent of the world's hydroelectric resources. Romania, with 40 billion kWh annually, is the best endowed of the European CEMA countries, while the GDR (.7 billion kWh) and Hungary (5.2 billion kWh) are the least endowed. The hydroelectric potential for Bulgaria and Poland is 12.1, and for Czechoslovakia 9 billion kWh annually.

The fuel reserve structure is the reason for coal's high share (from 90 to 100 percent in 1980) in the production of primary energy resources in Bulgaria, the GDR, Poland, Czechoslovakia and Mongolia. In Romania and Hungary the share of coal in fuel extraction and energy production is considerably less (18 and 45 percent respectively in 1980).

The uneven distribution of energy reserves in various countries is being increasingly smoothed out by scientific and technical progress. The use of fast neutron and thermal neutron reactors, and in the future thermonuclear and solar installations will compensate for this uneven distribution of fuel and will change the structure of fuel and energy complexes, which will be less dependent upon natural factors.

FEC development is also determined by the magnitude and direction of export-import flows of energy between countries in the socialist community and between other countries. Using the advantages of the international socialist division of labor, the other countries in CEMA are meeting their fuel and energy needs mainly through production and mutual deliveries within the socialist community.

Participating in the international division of labor, CEMA countries are supplying energy resources to capitalist countries. Important roles in the Western European energy balance are played by deliveries of gas, oil and petroleum products from the USSR, coal from Poland and petroleum products from Romania. The shares of CEMA country energy sources in Western Europe's energy consumption and total imports are 8 and 15 percent respectively. The agreement to deliver over 100 million tons of Soviet coal from the Neryungri deposit to Japan over a 20 year

period and for Japan, in its turn, to supply the USSR with the machinery necessary for the development of this deposit is mutually advantageous cooperation on a compensation basis. The implementation of the "gas - pipe" project between the USSR and a number of Western European states will make it possible for them to import up to 40 billion m^3 of Soviet gas annually over a 25 year period.

The unification of electrical energy systems can become one of the most promising directions in general European cooperation, permitting the optimal use of Europe's fuel and energy resources. According to available estimates, making the load schedules and capacity reserves of energy systems in Eastern and Western Europe compatible could, if implemented, reduce requirements for electric power station installed capacity by about 8,000 MW.

The deepening of cooperation with developing nations is oriented towards the further expansion of assistance to them in geological exploration for fuel and energy resources and in the creation of FEC sectors. In their turn, developing nations can be additional suppliers of oil and gas to CEMA countries.

In view of the considerable inertia in the FEC, the new conditions of energy supply have required the timely reorientation of foreign countries in CEMA towards the hastened development of national energy resources, the accelerated development of the coal industry, nuclear and hydroelectric power engineering and the reduction of oil's share in energy consumption.

The most dynamic sector in the FEC is electrical power engineering, which to a considerable degree determines the acceleration of scientific and technical progress in the national economy. Electrification increases labor productivity, something which is acquiring decisive significance for the efficient operation of the economy in view of the reductions in labor resource reserves in the majority of CEMA countries.

As a rule, the growth rates in electrical energy production and consumption outpace the growth rates in the production and consumption of primary energy resources, helping to reduce the share of natural organic fuel.

In the 1970's the structure of electrical energy production in CEMA countries saw a reduction in the share of thermal electric stations (TES) and an increase in the shares of atomic (AES) and hydroelectric stations (GES). (Table 2).

Table 2.

Year	Total	TES	GES	AES
1970	254.0/100	240.9/94.8	12.6/5.0	0.5/0.2
1975	350.2/100	325.3/92.9	19.4/5.5	5.5/1.6
1980	434.8/100	388.9/89.4	26.9/6.2	19.0/4.4

Note: Numerators are in billions of kWh; denominators in percent.

In spite of the reduction in their share of electrical energy production, thermal electric stations are the basis of contemporary electrical power engineering. In the second half of the 1970's, foreign countries of CEMA reduced somwehat the consumption of oil and gas at TESs and increased electrical energy consumption using low quality local coal and lignite.

In 1980 the share of AESs in total electrical energy production in the foreign countries of CEMA was 4.4 percent. In the same year in the USSR nuclear power plants accounted for 5.6 percent of electrical energy output. The intensification of nuclear power engineering's development is one of the most important tasks for countries in the socialist community.

Compared to 1970, by 1980 CEMA foreign nations had more than doubled electrical energy output at GESs. Nevertheless, the possibilities for the development of hydroelectric power engineering are still far from exhausted. At the end of 1981, the following levels of hydroelectric resource development had been reached (in percent): the GDR -- 87; Czechoslovakia -- 45.5; Bulgaria and Romania -- 30 each; the USSR -- 26; Poland 24 and Hungary -- 3.

The further development of hydroelectric power engineering will not only be due to the necessity for the more complete use of national energy resources, but also to the need to develop flexible capacity to cover the variable parts of electrical loads.

The coal industry plays a decisive role in the FEC of the CEMA countries, some of which have leading positions in world coal extraction.

In view of the increases in world prices for hydrocarbon fuels, it has become possible to efficiently develop some solid fuel deposits. In the long term, there will be an increase in the economic efficiency of using low heating value fuels.

In the 1970's there was a decline in the share of CEMA foreign countries' petroleum industries in the total production of primary energy resources. These countries (with the exception of Romania and Hungary), not having sizable petroleum reserves, extract very little or no petroleum.

Romania, having sizable petroleum reserves, has a great influence upon the overall indicators for the development of the petroleum industry in CEMA. In recent years in this country there has been somewhat of a decline in petroleum extraction (from 14.5 million tons in 1975 to 11.5 million in 1980). The Soviet Union is in first place in the world with regard to petroleum extraction, covering a significant share of the world's demand for this type of fuel. By 1980 in the USSR, petroleum's share in its total production of primary energy resources had increased to 45.3 percent.

During the 1970's the share of the gas industry in CEMA foreign countries increased, although its growth rates declined in the second half of the decade. This was due to the difficulties of increasing extraction from these countries' very limited proven reserves. By 1980, the share of gas in the Soviet Union's primary energy resource production had increased to 25.7 percent.

The new conditions of energy supply in CEMA foreign countries have made it objectively necessary to restructure their energy economies and to have more coordination in the development of FEC sectors in the socialist community. The progressive structural changes which have taken place have not been sufficiently rapid. These are: the replacement of fuel oil by coal, the development of nuclear power engineering, the more complete utilization of domestic energy resources (coal and hydro).

The long term targeted program for energy fuel and raw materials approved in 1978 oriented CEMA countries towards the deepening of coordinated economic mutual assistance up until 1990. This program's main goal is to support CEMA countries' economically substantiated demand for the main types of energy, fuel and raw materials. Among the basic directions in attaining this goal, the program defines improvements in the structure of the FEC and the entire economy and the formation of national economic complexes which are optimal with regard to energy supply possibilities.

The 21st Century will mark the transition to a fundamentally new energy system in which important roles will be had by energy produced from fast neutron reactors and thermonuclear installations in combination with synthetic fuels obtained from coal. The use of qualitatively new implements of labor will make it possible to supply the economy with a practically inexhaustible amount of energy.

Possessing powerful scientific-technical and economic potential, the CEMA countries have broad possibilities for meeting their long term energy requirements.

The efficient use of energy resources and the switching of power engineering to primarily an intensive path of development are acquiring major importance in making it possible to maintain high economic growth rates with declines in energy consumption growth rates. Studies show that the CEMA countries have large reserves for the efficient use of energy resources. If the European foreign countries of CEMA can succeed in reducing the unit energy intensiveness of national income by 40 percent, the present energy consumption could support a national income almost 1.5 fold higher.

The efforts of CEMA nations to efficiently utilize fuel and energy are directed towards eliminating its unproductive consumption, introducing energy saving equipment and techniques and improving the structure of the FEC and the entire economy.

Thus, in the decades ahead, CEMA economic development will be supported by the efficient use of energy resources, one of the main directions of which is the FEC's restructuring.

In the CEMA countries and in the entire world, FEC development in the 1980's and in the long term will be accompanied by substantial increases in nuclear energy's share in the structure of primary energy resource production. Simultaneously, in the European foreign countries of CEMA there will be declining shares of coal, petroleum and gas.

Electrical power engineering will continue to develop at accelerated rates. This will be expressed in further growth in the electrification coefficient of CEMA countries' fuel and energy balances. The Leninist position about the role of electrification as the energy foundation to the material and technical base of communism was and remains fundamental to the economic policies of communist and workers' parties in the countries of the socialist community.

Thermal electric power stations will continue to be the basis for electrical power engineering in CEMA foreign countries. In 1981 such stations' share in total electrical energy production ranged from 71 percent in Bulgaria to 100 percent in Mongolia.

In the Soviet Union, in spite of the relative decline in the TES capacity introduced compared to that of AES and GES, thermal electric stations will remain the basis of electrical power engineering in the decades ahead. Their construction is planned mainly in the country's eastern regions using low cost local fuel. At the end of 1980 TES capacity in the Soviet union totalled 192.4 million kW (72.1 percent), while that of GESs' was 52.5 million kW (19.7 percent), for AESs the figures were 12.5 million kW (4.7 percent) and for diesel and other stations 9.6 million kW (3.5 percent).

In the other CEMA nations, the share of electrical energy output at thermal stations will remain high. However, the development of nuclear power is gradually reducing it and the share of coal, oil and gas in the electrical energy production structure.

In the USSR the share of coal and gas in electrical energy production will remain quite high, while there will be a sizable reduction in the share of mazut.

The unit consumption of fuel in the production of electrical energy in the other CEMA countries is constantly declining, but it is still large compared to the Soviet Union. This increased consumption is to a great extent explained by the use of low heating value fuels (brown coal, lignite).

One of the main directions for technical progress in electrical power engineering, one which will reduce fuel consumption in electric power generation, is the concentration of power station and energy block capacity. Increased capacity also leads to declines in capital investments per unit of installed capacity and increases in labor productivity in construction and operation.

In the 1980's the CEMA countries will further increase total station capacity through the introduction of large energy blocks with unit capacities of 300, 500, 800 MW and more. In 1980, the "Mir" turbine units, at 1,200 MW had the highest capacity for such units in the unified energy systems of CEMA countries.

The Soviet Union is improving electrical energy production structure through the introduction and operation of economical 500 - 800 MW energy blocks.

There will be increases in the share of TETs, which have technological layouts (cogeneration of electrical and thermal energy) ensuring high coefficients of

useful fuel consumption. A comparison of the heat balances of condensation electric stations (KES) with TETs shows that useful fuel consumption at the boilers of the latter is almost two fold greater.

Scientific and technical work is continuing on the use of nuclear energy for the generation of electrical energy and heat (atomic heat and electric power stations -- ATETs) and for the generation of heat alone (atomic stations for heat supply -- AST). The USSR is building two experimental-commercial AST with water cooled, water moderated reactors.

Hydro's share in CEMA countries' energy production structure will not be very high. At present, hydroelectric stations' percentage of electrical energy production in a number of CEMA countries is quite high: in 1980 it was 10.2 percent in Bulgaria and 17.6 percent in Romania. There is an increasing share of pumped storage stations in this structure.

Nuclear energy is developing especially rapidly in the CEMA countries. The implementation of the nuclear program will save about 70 million tons of standard fuel. It is planned that by 1985 in Czechoslovakia nuclear plants will produce about 20 percent of the country's electrical energy and in Bulgaria the figure will be 26 percent. Up until 1985 water cooled, water moderated 440 MW power reactors (VVER-440) will predominate, while during 1986-1990 it will be the more economical VVER-1000 and VVER-1500 reactors.

During the 1990s work will continue on the creation of fast neutron reactors, which can not only produce energy, but also reproduce nuclear fuel on an expanded scale. In view of the limited reserves of uranium this is an important advantage over present generation reactors. If used in thermal neutron reactors, world uranium reserves can produce as much energy as is in the world's explored petroleum reserves.

The growth in the electrification of CEMA country economies and the increased trade in electrical energy within the socialist community and outside of its boundaries are factors in the further development of electrical energy systems. The expansion of international deliveries of electrical energy will permit CEMA countries to more extensively use electricity, creating prerequisites favorable to the accelerated restructuring of fuel and energy complex (FEC) sectors.

The introduction, in 1979, of the 750 kV electric power transmission line (LEP-750) from Vinnitsa (USSR) to Albertirsz (Hungary) began a new stage in the parallel operation of interconnected power systems (IPS), the areas of which have considerably expanded as a result of their connection to the Unified Power System of the USSR. The reliability of IPS operation has increased, there has been an enhanced intersystem effect from the sharing of load schedules and capacity reserves and the conditions have arrived for the further concentration of electrical energy production and the centralization of energy supply using large blocks at CES and reactors of 1000 MW and more at nuclear power plants.

In the decades ahead the main transmission lines of CEMA's European countries will be converted to 750 kV and the system of international lines expanded.

During this century and over the long term, the coal industry will remain the basis for the sectors in CEMA country FECs . Coal will increasingly replace oil for power generation, initially in its natural solid form and later as synthetic liquid and gas fuels . Coal will also be increasingly used as a raw material for the chemical industry, replacing petroleum and natural gas.

The share low quality fuels (brown coal, lignite) is growing and increasing amounts are extracted by the more economical strip mining method.

The percentage of all CEMA countries' petroleum industries in the energy production structure will gradually decline. Increased petroleum recovery from formations is an important reserve in view of limited petroleum resources. Present methods of field development do not provide for the efficient recovery of petroluem from productive formations. More than three-fourths of the petroleum produced in the Soviet Union is recovered through artificial flooding, increasing the oil recovery factor to 40-44 percent. The injection of chemical agents into formations, and the use of microbiological and other methods increase oil recovery another 20-30 percent. The future creation of new drilling equipment will help increase extraction from deep formations.

In this century in the USSR the gas industry's share in the total production of primary energy will increase, while during this time it will decline in the other European countries of CEMA due to their small natural gas reserves.

In the next few decades the solution of fuel and energy problems in CEMA countries will to a considerable degree be determined by the coordinated development of FEC sectors and their entire national economies. Further socialist economic integration will make it possible to overcome difficulties in CEMA country energy supplies, prevent reductions in economic growth rates and effect the transition to fundamentally new energy technologies which will be able to supply the economies of countries in the socialist community with practically inexhaustible amounts of energy.

11574
CSO:1822/149

SYNOPSES OF ARTICLES FROM TORFYANAYA PROMSHLENNOST', JANUARY 1984

Moscow TORFYANAYA PROMYSHLENNOST' in Russian No 1, Jan 84 p 32

[Synopses of articles from journal "Peat Industry", V. N. Kolesin, chief editor, USSR State Committee on Science and Technology, RSFSR Ministry of the Fuel Industry and BSSR Ministry of the Fuel Industry, Izd-vo "Nedra", 5,360 copies, 32 pages]

[Text]

UDC 622.331:658.387.4

SOCIALIST COMPETITION IN THE BRIGADE FORM OF LABOR ORGANIZATION

[Synopsis of article by A. V. Dragun, pp 2-4]

[Text] The forms and methods for the organization of competition, summarization of its results and moral and material stimulation of competition participants are examined.

UDC 622.331:631(470)

CONTRIBUTION OF LENTORF PEAT ENTERPRISE WORKERS TO SOLUTION OF FOOD PROGRAM

[Synopsis of article by N. F. Kozhokin, pp 5-6]

[Text] The article tells about the product produced by Lentorf peat enterprises for agriculture and the system for realizing this production in Leningrad Oblast.

UDC 622.331.002.001.5

RESULTS OF PRODUCTION TESTS OF NEW TECHNOLOGICAL SCHEME FOR PRODUCTION OF CUT PEAT

[Synopsis of article by A. Ye. Afanas'yev, N. I. Gamayunov, S. L. Kazakov, et al., pp 8-10]

[Text] The effectiveness of use of a technological scheme for the production of cut peat, providing for its drying in thin layers on an aerated backing, with subsequent repeated removal of the upper layers of the spread-out material as it dries to the stipulated moisture content. One of the methods for

the production of peat in accordance with the proposed scheme is described. It makes use of the pneumatic removal principle. The feasibility of using loosening of the spread cut peat and differentiated stirring of its upper part in dependence on seasonal conditions is evaluated. 1 table, 5 references.

UDC 622.331.002.5.004

INFLUENCE OF RATE OF MOVEMENT ON PASSABILITY OF WHEELED DRIVE OF PONTOON TYPE IN RIBBED SWAMPY MEADOW COMPLEX

[Synopsis of article by V. K. Kirillov, pp 10-12]

[Text] The author gives the results of investigations for study of the influence of the rate of movement on the passability of machines with a wheeled drive of the pontoon type under conditions of a flooded peat deposit of the upper type. It is concluded that there are optimum rate of movement regimes in dependence on movement conditions. 1 table, 3 illustrations.

UDC 622.331.001.5

SOME RESULTS OF SEARCH WORK IN PEAT PRODUCTION TECHNOLOGY FIELD

[Synopsis of article by B. A. Bogatov, G. A. Kuptel', F. G. Khalyavkin and N. N. Semenovich, pp 12-15]

[Text] This is a comparison of different methods for the granulation of peat: without heating, with heating and damping. The possibilities of improving the quality of the granules formed with heating and damping are demonstrated. The possibilities of pressing peat with an explosion are examined. 4 illustrations, 4 references.

UDC 553.97:534.004

INVESTIGATING ELASTIC (ACOUSTIC) PROPERTIES OF PEAT WITH PHASE TRANSFORMATIONS

[Synopsis of article by N. I. Gamayunov and G. N. Ivanov, pp 15-18]

[Text] Expressions are derived for the dependence of the velocity of propagation of longitudinal elastic waves in peat on moisture content and on temperature during the freezing of peat. The elastic modulus of peat in thawed and frozen states is computed. 1 table, 2 illustrations, 3 references.

UDC 553.97:626.83

INFLUENCE OF UPPER PEAT DEPOSITS AND PEAT PRODUCTION ON AMBIENT MEDIUM

[Synopsis of article by V. V. Yanushevskiy, N. V. Zinina and I. A. Marchenko, pp 18-19]

[Text] In the example of the Meshcherskaya Lowland a study was made of the influence of drying of peat deposits of the upper type on the hydrological

conditions of the region and local biocoenoses. It was established that the drying and working of peat deposits exert no negative influence on the ecological conditions and hydrological features of the region. This conclusion can be extended to other regions with similar geological, geomorphological and hydrological conditions. 3 tables.

UDC 658.382.3:622.331"313"

METHOD FOR PREDICTING ACCIDENTS DURING PRODUCTION WORK

[Synopsis of article by Ye. A. Vasil'yeva and N. V. Zinov'yeva, pp 19-22]

[Text] The article describes a method for predicting accidents during production work at peat industry enterprises using a mathematical approach based on a knowledge of the law of distribution of accidents with time.

UDC 622.331:622.243.144

DRILLING MUDS BASED ON MODIFIED PEAT

[Synopsis of article by I. I. Lishtvan, I. V. Kosarevich, S. S. Mal', et al., pp 22-24]

[Text] The possibility of using peat in the preparation of drilling muds for different purposes is demonstrated. Such muds have a number of advantages over clay muds. 2 tables, 2 illustrations, 5 references.

5303
CSO: 1822/185

SOVIET BLOC COUNTRIES COOPERATE IN BUILDING NUCLEAR POWER PLANTS

Moscow EKONOMICHESKOYE SOTRUDNICHESTVO STRAN-CHLENOV SEV in Russian No 12, Dec 83 pp 46-50

[Article by Fedor Ovchinnikov, general director of MKhO IAE: "For the Development of Atomic Power" under the heading: "In the International Organizations of CEMA-Member Countries"]

[Text] The large machinebuilding enterprises of the CEMA member-countries and of Yugoslavia are members of the International Economic Association Interatomenergo (MKhO IAE) which was established in 1973. Those enterprises include the Kraftwerksancagenbay combine (GDR), the Megat Industrial Association (Poland), the heavy machine plant of Romania, the Skoda concern (CSSR), and the Yumel Association (SFRY). Organizations from other countries participate in its activities. These latter organizations are responsible for cooperation in the field of the production and procurement of equipment for nuclear powered electrical stations. They are: the Ministry of Machinebuilding and Electronics of Bulgaria, the Khemimash Enterprise of Hungary and the All-Union Association Soyuzglavzagran-atomenergo of the Ministry of Power and Electrification of the USSR.

Over the period of its existence the MKhO IAE together with various bodies of CEMA has carried out a whole series of operations directed toward deepening multilateral cooperation in the filed of nuclear power and nuclear equipment manufacture.

The association took an active part in the preparation and realization of the Program for Maximum Possible Development of Nuclear Equipment Manufacture in CEMA member-countries which was approved at the 31st meeting of the 1977 session of CEMA. In this document the goals of the cooperation of the countries were set forth, the ways of achieving them, the obligations of the participants to render technical cooperation in the construction of AES, and for building up productive capacity in the manufacture of special equipment.

Together with the planning bodies of the countries, the MKhO IAE prepared proposals for the organization of an international socialist division of the work in the field. The proposals underlie the basic Agreement for Multilateral Specialization and Cooperation in the Production and Mutual Procurement of Equipment for Nuclear Stations in the period 1981-1990 which was signed on the 28th of June 1979 by the chiefs of the seven governments who are CEMA members; namely, Bulgaria, Hungary, Poland, Romania, USSR, CSSR and SFRY, who are the founders of the MKhO IAE.

Having the goal of accelerating the development of nuclear power and nuclear equipment manufacturing, the agreement provides for the combined efforts of the countries in the development of the technologically complex power plant equipment in order to realize the broad plans for the construction of AES.

General coordination of the cooperation of the countries participating in the agreement and systematic monitoring of the course of their fulfillment of accepted obligations is accomplished by an Interstate Commission (MPK) consisting of the authorized representatives of the countries at a level, as a rule, of the deputy chiefs of the governments.

A whole series of matters in the mission of the MPK are resolved with the direct participation of the MKhO IAE. Among them are such important matters as:

--the assembly, conducted together with the organizations of the countries, of information on the fulfillment of the countries' obligations for deliveries of equipment in current and succeeding years,

--the analysis and summarizing of data about the preparation in the countries for producing equipment for AES, and

--the development of proposals for further deepening the specialization and cooperation in production including individual kinds of fittings for AES and equipment for the storage of spent nuclear fuel.

The provision for nuclear power of proper fittings, especially the quick-acting and shutdown systems as required for the safe operation of nuclear electric power stations is very important. The solution of this problem, to a significant degree, will permit curtailing imports and will provide nuclear power stations under construction with the necessary equipment by proper production and reciprocal procurements. In this connection, in accordance with the mission of the MPK, specialists from the countries and the MKhO IAE prepared proposals for specialization in the manufacture of the appropriate fittings.

The organization of multilateral cooperation made necessary the development of unified documents providing for production and export and the development of common technical specifications for the procurement of fittings. At present they already have been accepted and are being used by the enterprises of all the countries participating in the multilateral specialization.

Having in mind the special importance that qulaity in the equipment for AES has today, particularly for those kinds of equipment upon which the safety and reliability of the operation of the power unit depends, the MPK formed a temporary working group (VRG) to consider questions of its further improvement.

The MKhO IAE is directly involved in the activities of the VRG. Together with the Soviet part of the VRG, it prepared specific recommendations on these matters. The MPK charged the VRG, with the participation of the MKhO IAE, to also develop proposals on the size and content of a unified program for monitoring the quality of equipment including that for transportation, installation and operation. The association is actively involved in this important matter.

The upper unit of a VVER-440 reactor,
the Shkoda concern, Czechoslovakia.

Within the framework of the Interstate Commission, still another action is being completed. The question is the development of a unified price list for the specialized equipment in nuclear electric power stations having VVER-440 and VVER-1000 reactors. As a result, at present an agreed list has been established for the principle kinds of products. The MKhO IAE participated in this, specifically in the preparation of technical proposals for the price list, in conducting conferences of the experts from the foreign trade institutions, and summarizing the materials received from the countries and so on.

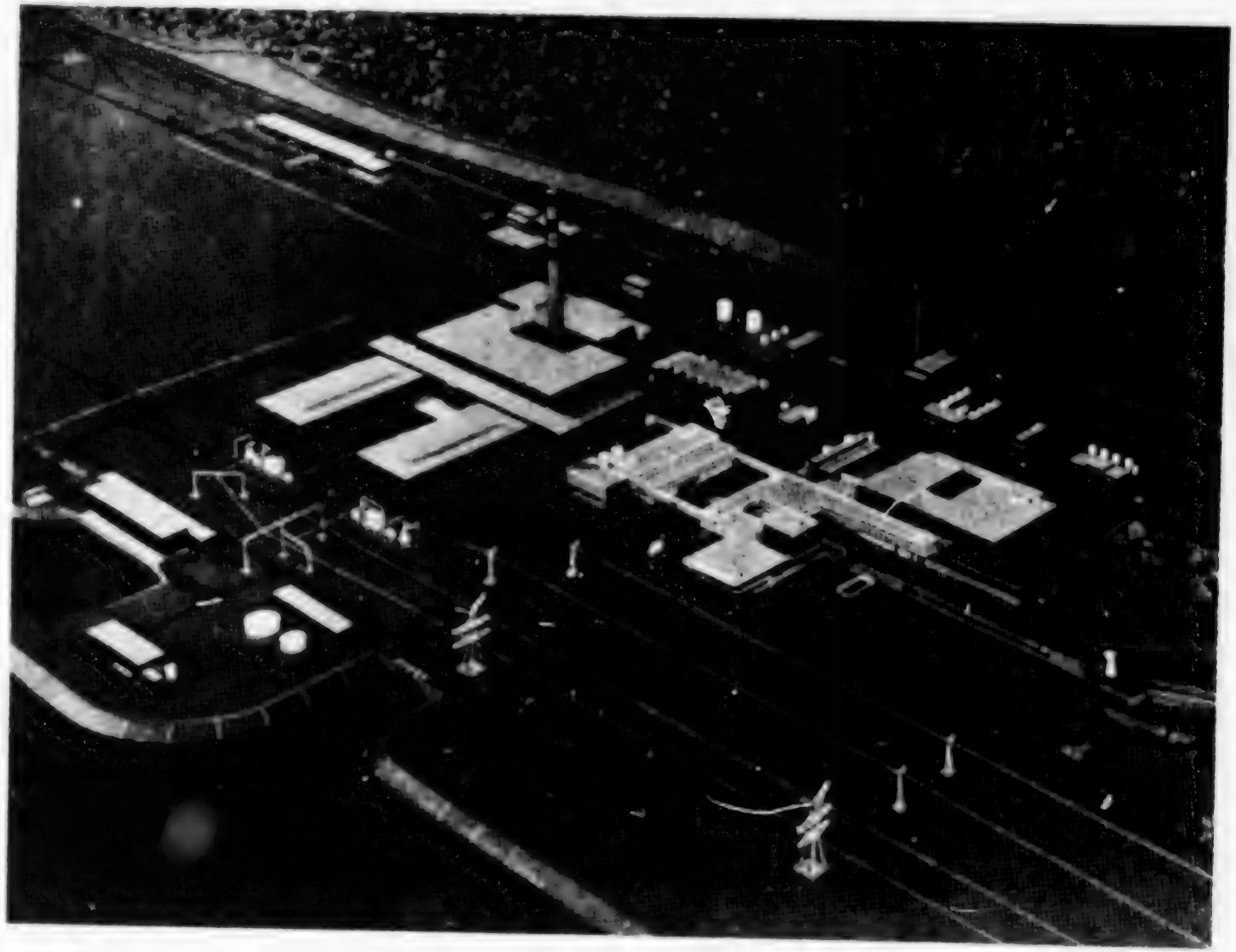
Deep specialization dictates a need to develop unified standards and specifications with which all enterprises of the countries participating should be guided in producing and procuring modern equipment, and on the basis of which the equipment at AES should be operated. Taking account of this, the MKhO IAE organized the collaboration of the countries in developing these standards and specifications. At present, a program for the work in this field has been realized and agreed to. On the basis of it, about 90 standardizing and technical documents will be prepared. They cover general aspects of AES safety, rules for the installation and safe operation of equipment and piping, and also the monitoring of weld joints, standards for calculating strength, metrological provisions for the operation of AES, and other matters. The first documents already have been approved. By the end of 1983, agreement on about 30 more will have been completed.

Proceeding from a decree of the 97th meeting of the Executive Committee of the SEV, within the framework of the MKhO, a project for a comprehensive program was prepared for developing standardized and engineering documents for the design, construction, installation and operation of nuclear electric power stations. Its completion will assure a high level of unification in planning, design and technological solutions and will permit making the operation of AES still more reliable. The creation of unified standards and specifications assists in deepening the specialization and cooperation in production, and in broadening the spere of the multilateral cooperation of the SEV-member countries.

As is known, the program for the development of nuclear power in the SEV-member countries is oriented toward the construction of nuclear electric power stations having VVER [Water-Water Power Reactors]. The tempo of the work is continuously rising. In the European SEV countries slone at present power units with a total capacity of about 5 million kW have been put into service. In various stages of design and construction are a whole series of units with VVER-440 and VVER-1000 reactors. For the first time in these countries a VVER-1000 reactor will be put into operation at the Kozloduy nuclear electric power plant in Bulgaria. Construction work will be carried out for such power facilities in the GDR and Czechoslovakia.

At the same time, work is proceeding on the improvement of equipment for AES and on the development of new kinds that will increase reliability and economy. A multilateral agreement has been signed and adopted for a joint program by the SEV-member countries on the problem "The assimilation of power units having a power of 1000 mW and the further improvement of reactors of this type." Many institutes and design buros in the socialist countries are occupied with its realization. The MKhO IAE participated in the preparation of the agreement and the program for cooperation, and at present, is carrying out a set of measures for the fulfillment of the program and is acting as the coordinator for that series.

Specifically, the association is organizing the development of a new, highly effective filtration installation for the ventilation system of spaces in an AES, which is being carried out by specialized enterprises of the USSR, Czechoslovakia and Yugoslavia. The development of industrial models of these installations is envisaged which will answer to modern requirements and will permit an increase in the operational indicators of nuclear electric power stations. The cooperation is being conducted on a contract basis.



Model of the Zharnovets nuclear electric power station, Poland

The MKhO is preparing the publication of an album of equipment for nuclear electric power stations having VVER-1000 units which includes general views, descriptions, and the characterisitcs of the new equipment produced on the basis of the agreement of 28 July 1979. The album will be used as informative material in preparing for and conducting meetings of the Interstate Commission, and in technical and commercial negotiations.

The cooperative solution of large national economic matters such as nuclear power requires the systematic development of contacts between the enterprises of the countries, the institutes, and the nuclear electric power stations. For this purpose, the MKhO IAE annually organizes international seminars and conferences for the exchange of information. At them, a broad range of the urgent technical and economic problems of nuclear power and nuclear equipment manufacture are discussed. The leading specialists and representatives of the ministries and departments responsible for development in these sectors and for mutual cooperation take part in the work of the conferences.

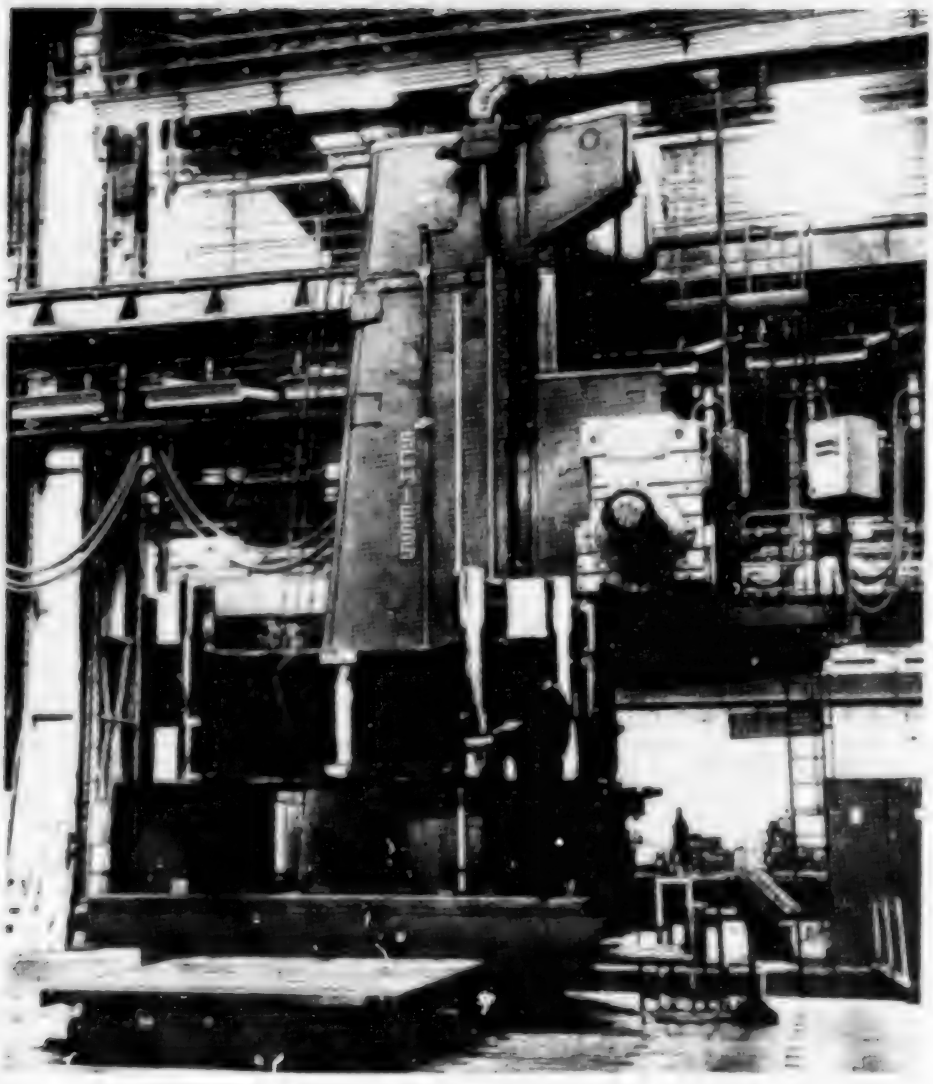
At seminars, the matters discussed are:

--the production of equipment,
--the reliability of the structure and the operation of AES particularly VVER-440 reactors,
--ways of shortening schedules and of improving methods of constructing, installing and exploiting capacity,
--the creation of earthquake-resistant AES, and so on. From the results of the seminars, collections of reports are published and recommendations are prepared on the most important problems of practical importance.

The association also uses other forms for exchanging experience such as propaganda on the achievements of the socialist countries in nuclear power and nuclear equipment manufacture. For this, topical international fairs and expositions are organized. Thus, in 1981 the MKhO IAE in cooperation with the USSR Ministry of Power and Electrification conducted the international exhibition "Energoavtomatizatsiya-81" and, in 1982, it prepared a cooperative exposition by the countries who are founders of the NKhO IAE at the international fair in Plovdiv Poland on cooperation in the field of producing equipment for nuclear electric power stations. In 1984, MKhO IAE participation in the Leipzig spring fair is envisaged.

On the basis of proposals of the founding countries and the decisions of the general council, the association carried out a search for specific facilities for economic activities in various directions. Experience acquired over recent years today permits defining the possibility and advisability of economic activity in accordance with the decree of the 93d meeting of the SEV Executive Committee and, in particular, for organizing economic activities of the MKhO IAE. At the present stage, one of the steps could be to start the development of a unified system for providing existing nuclear electric power stations with spare parts.

It also seems advisable to continue work on the comprehensive coordination of the amounts and kinds of production of spare parts, tools and nonstandard equipment for nuclear plants. This could be done, for example, at the repair plant in the city of Kozlodye (Poland) and at other similar enterprises in other countries.



At the heavy machinery plant in Bucharest where equipment for nuclear electric power stations is produced.

The growth in the number of power units placed in operation in SEV-member countries brings about a need for the organization of multilateral cooperation in the field of repair service. This matter also is within the purview of the MKhO IAE.

The association is conducting research along another urgent line. Various ways of increasing the quality of the training of operating personnel for nuclear electric power plants are being studied. In a first plan, the creation, by the

founding members of the MKhO IAE, of an educational center for training on the VVER-1000 is being put forward. This problem is acquiring more and more importance since a high level of preparation for specialists is an indispensible condition of assuring the reliable and safe operation of AES and the economic efficiency of their operation. From world-wide statistics it is known that a large part of the emergency situations occurring at nuclear power plants in various countries take place because of the fault of personnel.

In conclusion it is desired to note that SEV-member countries and the SFRYu have taken important steps in the organization of multilateral cooperation in the field of nuclear power and nuclear equipment manufacture. Over a short period of time important work has been done on the development of specialization and cooperation in the production of equipment for AES, the scale of the construction of AES has grown several fold, repeatedly the reciprocal procurement of the newest equipment has been increased, and a large capital investment has been realized for building up industrial capacity.

In this complex process, the International Economic Association Interatomenergo, to which an ever more substantial role is being allotted in the further deepening and broadening of multilateral cooperation, is taking a direct part.

9136
CSO: 1822/171

NUCLEAR POWER

FIRST UNIT BEGINS OPERATING AT IGNALINA AES

Moscow PRAVDA in Russian 3 Jan 84 p 2

[Article by Yu. Stroganov, editor of the newspaper ENERGETIK of the Western Construction Administration, and D. Shnyukas, PRAVDA correspondent, Snechkus, Lithuanian SSR: "The First Reactor"]

> [Text] The launching of the first power unit at the Ignalina Nuclear Electric Power Station has taken place. Today Lithuania is a region of highly developed power engineering.

... The television screens of the AES control panel are lighting up. On them are colored schematic depictions of the units. The invisible process of generating electricity is in progress, and the nuclear reactor with a capacity of 1.5 million kilowatts is in operation.

Here, at the All-Union Komsomol construction project, each person is trying to make creative efforts to solving the problems posed by the 26th CPSU Congress. Worker A. Salata of the Motor Vehicle Transport Administration became the winner of the USSR State Prize for 1983. It was he who was one of the main initiators of an advanced mechanized method of laying the concrete mixture in one-piece structures with the aid of asbestos concrete pumps. This made it possible to shorten the AES building period by 180 days and to save 600,000 rubles.

Also being widely used are permanent metal and precast reinforced concrete forms and modular centering blocks. The equipment installation period has been reduced several times over due to putting into operation the first plant in the sector using an enlarged assembly of metal structures and pipelines.

Now the builders of the station have a new goal: to put into operation by the finish of the five-year plan the second 1.5 million kilowatt reactor. The total capacity of the four units of the station will be 6 million kilowatts.

... On the other bank of Lake Drukshyay, at the junction of the boundaries of Lithuania, Belorussia and Latvia, stands a small squat building with the inscription: "Friendship of Peoples" GES. This very small-scale electric power station was constructed in the '50's by the kolkhozes of the three filial republics. Today over 500 of the country's enterprises are taking part in the construction of the giant nuclear electric power station in Lithuania. The power engineers' city of Snechkus has arisen not far from it, in the pine forest.

12151
CSO: 1822/152

DELIVERY DELAYS AT BALAKOVO AES

Moscow SOVETSKAYA ROSSIYA in Russian 1 Dec 83 p 3

[Article by V. Krotov, minister of Power Machinebuilding: "Empty Changes"; "Delivery--On Time!"]

[Text] In the 10 August issue of SOVETSKAYA ROSSIYA, a letter, "Empty Changes", from the Balakovo AES Construction Group was published. Brigade leaders of the installation collectives A. Baginskiy, M. Dityuk and A. Okupov reported that the mounting and assembly of the equipment for the first power unit is being delayed by the supplier-plants. The authors appealed to the partners with a request to make up for the supply debt and to observe strictly the schedule for shipment of assemblies and parts. The editorial board has received a series of official replies. Constant checking has shown, however, that some officials proved to be more lavish with promises and with assurances than with actual assistance. The newspaper spoke of this in the rejoinder, "Replies ... Without an Answer", in the 20 October issue. Here, then, is a new reply from the Ministry of Power Machine Building, dated 17 November.

The correspondence, "Replies ... Without an Answer" was discussed on 24 October of this year at an expanded session of the Board of the Ministry of Power Machine Building, with the participation of the general directors of production associations and directors of enterprises. The critique was acknowledged to be correct.

Completion of the equipment supply for the first unit of the Balakovo AES is envisaged in the second quarter of next year. The enterprises of the Ministry of Power Machine Building have been given corresponding instructions for on-time preparation of the production and ensuring the equipment output in the planned periods. With respect to the specific items on which there was a question in the newspaper, the following shipment periods were set:

Production Association ATOMMASH--of five sluices, three will be shipped in December and the remaining two--in the first quarter of 1984.

Production Association "Krasnyy Kotel'shchik"--10 units of heat exchange equipment shipped, 2 units will be delivered in November. With regard to turbine regeneration systems, one unit of equipment has been shipped, and another one will be delivered in November of the current year.

Podol'skiy Machine Building Plant imeni Ordzhonikidze--three heat exchangers were sent to the Balakovo AES and two will be shipped in November of the current year.

Belgorodskiy Power Machine Building Plant--of 1376 tons of pipelines 1184 tons have been delivered, and the remaining 192 tons, as pipes are received from the enterprises of the USSR Ministry of Ferrous Metallurgy, will be shipped in November-December 1983.

Production Association "Sibenergomash"--all four condensate tanks have been shipped.

The board pointed out the irresponsibility of the supervisors of certain associations and enterprises who designate and break the equipment shipping deadlines, named in the reply of Deputy Minister V.G. Pershin to the letter of the assembly brigade leaders. Chief of the Administration of Nuclear Machine Building V.G. Sotsenko and Deputy Minister V.G. Pershin were given strict warning by the jurisdictional enterprises for inadequate monitoring of observance of the deadlines for deliveries of equipment for the AES.

12151
CSO: 1822/152

NEWS FROM ATOMMASH

Issue 49

Moscow SOTSIALISTICHESKAYA INDUSTRIYA in Russian 1 Dec 83 p 2

[Summaries of issue 49, 52 of 1983 and 1-6, 1984 of SOTSIALISTICHESKAYA INDUSTRIYA]

[illegible] the [illegible] of socialist competition [illegible] at [illegible] Machine Building Plant [illegible] publishes an open letter from the collective of the entire central creative cooperation area of the production association [illegible] Machine Building Plant [illegible] Experimental Machine Building Plant and Experimental Scientific Research Machine Building and Special Steel Plant [illegible].

The letter sends a call to their colleagues with a proposal to make a worthy start in creative cooperation according to the "Worker Corrective" principle. The [illegible] and a request will permit the rational use of plane time between the [illegible] and the customer, the solution of disputed questions concerning financing, and speeding up the start-up of components into production.

[illegible] the title "Worker's Platform," this issue carries the speech of the [illegible] Brigade leader of the equipment and nonstandardized equipment [illegible] Department. This leading collective made a commitment to fulfill its annual plan by 7 October, but it was already working on next year's assignment since September. The brigade leader tells how this success came about.

The reader's "Pro and Con--a Strict Accounting" is in the newspaper. The information of the [illegible] Power Supervision of [illegible] Power System], L. Kamayunov, publishes an article "Channels of Waste."

"I" a [illegible] presents a humorous piece "I Beat Myself" to the readers. The [illegible] also [illegible] cultural and everyday news.

Issue 52

Moscow SOTSIALISTICHESKAYA INDUSTRIYA in Russian 23 Dec 83 p 2

[Text] Issue 52 (260) of SOTSIALISTICHESKAYA INDUSTRIYA at Atommash publishes reports on the success of the leading collectives of builders and operators for the ahead-of-schedule completion of the third year of the five-year plan. By the Day of the Power Workers, the collective of the mechanized work construction control sector of Volgodonskenergostroy [Volgodonsk Power Construction Trust] attained good indicators. The builders are now working on next April's account. The chief of sector 2, Ye. Malyayev, reports about this in his article "Calculation Plus Initiative."

The causes of the slow construction work pace at Atommash, which is lagging far behind schedule, are analyzed in the editorial "Attention...to the Start-ups."

Several years ago Atommash developed a cost accounting and cost accounting terms system for all subunits. However, this progressive system was not put into practice at the enterprise. Why? The correspondence of A. Pilipova "What Hinders Cost Accounting?," published in this issue under the heading "To Improve the Management Mechanism," answers this question.

The deputy chief of the division of NOT [scientific organization of labor], wages and management, N. Nikiforko, appears in the newspaper with the article "They Are Helping the Norms." The author tells about the measures for reviewing output norms and lowering labor expenditures and it urges that this work be accomplished at a faster pace.

The issue also contains the article "Words to the Wind," under the heading "How Are They Serving You?," the correspondence "Standard...Instead of a Boot," and answers criticisms.

Mazut Volgodonskiy has the feature article "A Monument to Myself."

Issue 1

Moscow SOTSIALISTICHESKAYA INDUSTRIYA in Russian 1 Jan 84 p 2

[Text] Issue 1 (261) of SOTSIALISTICHESKAYA INDUSTRIYA publishes the speech of the deputy general director of Atommash, V. Zabar, under the heading "A Shock Pace--From the First Days." The author writes that newly-arrived 1984 will be the most arduous and crucial year of the five-year plan. The plant must significantly increase the output of commodity production, develop practically an entire products list of nuclear equipment as stipulated by the plan, and place it, in a timely manner, in the country's nuclear power stations.

To successfully fulfill this program it is necessary from the first days of January to labor intensely, with a total output of energy, to treasure each hour and each working minute.

[illegible] installation [illegible] [state all-union [illegible] for specialized operations of the [illegible]] are [illegible] the schedule for the construction of [illegible] projects.

Meetings of the party committee [illegible] of the [illegible] and [illegible] have been held. Last year's work results have been summed up at them and the tasks for the present year have been [illegible]. The [illegible] the manager of the trust [illegible] and the general director of [illegible], and also those who took part in the [illegible], analyzed the state of affairs in their collectives, spoke about the duty of the builder and [illegible] to work effectively, at full efficiency, [illegible], [illegible] socialist obligations which were undertaken, and [illegible] in carrying out the decisions of the December (19[illegible]) [illegible] central committee plenum.

Detailed accounts of the party [illegible] are being published in the issue.

The manufacture of [atomic electric power station] equipment is [illegible] with castings and forgings production. The [illegible] depends on how the casting and forging [illegible]. A joint special journalistic [illegible] of [illegible] and [illegible], published under the heading "[illegible]," is highlighted by an analysis of the work of this important sector.

Under the heading "We are discussing a school reform project," the newspaper is carrying an article by the director of school [illegible], [illegible], "[illegible] with difficulty." [illegible] published in the issue.

CSO: 1800/153

CONSTRUCTION PLANS APPROVED FOR CENTRAL YENISEY GES

Moscow IZVESTIYA in Russian 2 Feb 84 p 1

[Article by M. Malakhiyev; Krasnoyarsk: "An Electric Power Giant Will Arise"]

> [Text] The technical and economic plans for construction of the 6-million-kilowatt Central Yenisey GES have been approved. The hydroelectric station will be built near the city of Lesosibirsk, where the mighty river cuts through a mountain ridge at the so-called Burmakinskaya Narrows.

"The river bed is fairly narrow here," said Ye. Smirnov, deputy chief engineer of the Gidroproyekt Institute imeni S. Ya. Zhuk, and head project engineer for the new GES, "about one-and-a-half kilometers." But these firgures give a better picture: the annual drainage in the power plant's area is 250 cubic km, the flow rate is about 8,000 cubic meters per second and almost 7 times that during peak runoff. The GES will house sixteen 375,000-kilowatt generators in the first phase of the project.

The plan calls for two-stage locks. Each stage will have two locks to permit ships and rafts to lock through simultaneously. A highway and a rail line will cross over the hydroengineering complex. These crossings will serve as the foundation for the development of transport links with the right banks of the Yenisey and the Angara.

The experts found a novel solution to preserve the Gorevskoye non-ferrous metals deposit, located in the area which will be flooded. They proposed that the mine be protected by a high dam, a system of underground drainage chambers, screens to stabilize the ground and drainage pumping stations.

"Residential, industrial and agricultural facilities will be removed from the flood zone," continued Yevgeyniy Alekseyevich. "Modern villages are planned for those persons displaced. The villages will have well-built homes and all cultural and service facilities, as well as the necessary economic infrastructure."

Forests on the projected lake bed will be cut. Broadleaf varieties will become valuable raw material for lumber enterprises which are to be built in Lesosibirsk.

The systematic development of Siberian hydroelectric resources and the production of cheap electricity are playing a most important role in the formation of territorial-industrial complexes in Western Siberia [in boldface].

12595
CSO: 1822/168

CONSTRUCTION PROBLEMS AT KAYSHYADORSK GAES

Moscow STROITEL'NAYA GAZETA in Russian 22 Feb 84 p 2

[Article by V. Tumanov; Kaunas: "A 'Temporary' Enterprise"]

[Text] FACT: The Vilnius office of STROITEL'NAYA GAZETA received a tip from A. Makulis, deputy chief of construction management for Litovenergostroy. He said that the Kaunas KPP [Production Enterprise Combine] of the Soyuzenergostroyprom Production Association has not met fabrication and shipping schedules of prefabricated reinforced-concrete structures and a number of other products destined for the Kayshyadorskaya GAES [Pumped-Storage Electric Power Plant].

The Kaunas KPP supplies up to 6,000 cubic meters of prefabricated reinforced-concrete structures a year to Litovenergostroy out of its total production of 80,000-85,000 cubic meters. The rest is shipped out of the republic. At the same time, Litovenergostroy receives 10,000-15,000 cubic meters of such products, including some identical items, from distant suppliers.

REFERENCE: The Kayshyadorsk GAES, the largest in Europe with 8 power units and a total output of 1.6 million kilowatts, is being built on the banks of the Neman River near Kaunas (see STROITEL'NAYA GAZETA 27 May 1983 for a story about the plant).

COMMENTARY: It is hard to restrain one's emotions when talking about the Kaunas KPP. It is shameful that such an authoritative union department as the USSR Ministry of Power and Electrification has in its system such a neglected production facility with outmoded technology. Chief Engineer V. Valenkin, who acquainted me with the operation, said, "The combine is like a stepchild, both of Minenergo and of the republic. Everyone makes demands of it, but do not even ask that they will do anything for it!"

The enterprise was built over 20 years ago as a temporary industrial base for construction of the Kaunas GES. Its condition is well illustrated by the ironic aphorism: "There is no more permanent structure than a temporary one."... The temporary sewers, water lines and railroad spurs are in emergency condition. Buildings for cleaning operations have not been constructed.

Molding production has been modernized in the last few years, but it stands in an unenclosed area. The structural steel shop, where atomic power plant enclosures are made, is inside a building which had been intended for the vehicle fleet. The building had not even been accepted for production. The combine does not have a finished products storage area.

When the decision was made to build the Kayshyadorskaya GAES, it was decided to develop the Kaunas KPP to meet the needs of that project. The Gidroproyekt Institute developed a renovation plan. Litovenergostroy began the renovation work. However, after spending 700,000 rubles on the concrete shop, the reinforcing bar shop and the compressor station, they removed their construction personnel and never returned. The combine workers somehow managed to get the concrete shop in order through their own efforts. However, the reinforced-concrete skeletons of the other units have been listed as "incomplete" for three years.

If urgent measures are not taken, the hopeless technical condition of the enterprise might slow down construction of the Kayshyadorskaya GAES.

And one more question: why allow cross-hauling of structural materials if they can be acquired locally? Minenergo USSR should think about that also.

12595
CSO: 1822/168

NON-NUCLEAR POWER

TOMSK TETS TO BE ENERGY CENTER FOR PETRO-CHEMICAL COMPLEX

Moscow IZVESTIYA in Russian 19 Dec 83 p 1

[Article by L. Levitskiy: "Another Siberian Giant. Construction Begins Near Tomsk On The Largest TETs"]

[Text] It will provide heat for a developing petro-chemical complex and, further in the future, for the city. The TETs is being built by the Ministry of Power and Electrification and the Chemical Industry Ministry.

The discussion on whether to build the Tomsk TETs lasted for several years. Its scale was frightening--larger than any in Siberia. Some objected, saying it would be easier to build one power plant for industry and another for the city. Electricity could be obtained from other regions. Economics overcame the arguments of the agencies for separate projects. A single combined enterprise would be cheaper, generating costs would be lower and fuel consumption significantly lower. At least a million tons of coal a year would be saved.

The TETs is being built on the same site as the Neftekhim combine and will become its power center. Specialists from the Tomsk Department of Atomteploelektroproyekt calculated the needs of the main consumer. The various chemical processes will receive steam in a wide range of pressures, from 6 to 100 atmospheres, and temperatures, from 250 to 545 degrees. And it will be needed by 1986. Otherwise, the polyethylene plants will be without process heat.

This is why the construction schedule is so extremely tight. The designers have provided for the most effective modular construction method and for early completion of the steam-and-hot-water module. The first turbine should be generating power in 1987. It will have an output equal to the present city power plant. The first phase of the TETs includes several such modern high-power units. A new type of steam generator will be provided with them. The Barnaul Boiler Plant, together with the All-Union Power Engineering Institute and scientists from the Tomsk Polytechnical Institute, has developed and organized production of new high-efficiency boilers. The Tomsk TETs will be one of the first to receive the new technology.

The TETs is designed to operate on natural gas and coal.

"The first units will have to be powered by gas," said S. Boyarshinov, deputy chief engineer of the Tomsk Department of Atomteploelektroproyekt. This will greatly reduce costs and construction time. We otherwise just would not make it on time."

The scientists of the Economics Institute of the Siberian Department of the USSR Academy of Sciences support the designers' view. They calculate that this will save hundreds of millions of rubles. Well, let the economists have the last word. But time passes. The TETs buildings cannot lag behind the swiftly rising Neftekhim.

12595
CSO: 1822/167

BRIEFS

MOSCOW TETS UNIT COMPLETED--The tenth power unit of TETs-21 has gone on line two months ahead of schedule. "By the time the reader gets his latest MOSKOVSKAYA PRAVDA, our new power unit will have operated for 40 hours," N. Grigor'yev, director of TETs-21, told this correspondent. "The 110,000-kilowatt turbogenerator has a boiler with a capacity of 480 tons of steam per hour. Getting it on-line ahead of schedule is a great victory for the general contractor, the Mosenergomontazh Trust, the Elektrotsentromontazh Trust, the Soyuzenergozashchita Association and the enterprises of Mosenergo, including the collective of our TETs. All of us took part in the "workers' relay-race" competition. It was the cooperation of each member of the team that enabled us to build and start up the power unit ahead of schedule." What will it provide the city? First of all, more flexible and reliable electric power for the capital. Second, new housing projects in the northern part of the city, from Sbilov to suburban Khimki, will receive heat. All of the newly-installed equipment is working properly. The 72-hour complex test has already passed its peak and will end on the evening of 6 November. On the eve of the 66th anniversary of the October Revolution, the powerful steam heat-turbogenerator will enter into service. [Text] [By G. Pavlov] [Moscow MOSKOVSKAYA PRAVDA in Russian 5 Nov 83 p 1] 12595

PROGRESS ON BARNAUL TETS-3--While still under construction, the TETs-3 has generated 2 billion kilowatts of electricity. The first unit of the power plant went on-line into the Siberian power system two years ago. Today, two boilers and turbines are in operation. Lignite from the Kansko-Achinsk Basin fuels the plant. When the second phase starts up, the Barnaul TETs-3 will be the largest heat and power station in Siberia. [Text] [By L. Parshukova] [Moscow SOVETSKAYA ROSSIYA in Russian 29 Jan 84 p 1] 12595

KRASNOVODSK TETS NEARING COMPLETION--Krasnovodsk--The final work is being completed on one of the most important projects of the 11th Five-Year Plan: the Krasnovodsk TETs. The power plant is being expanded and its output increased considerably. The Karakum Canal, a precursor of vineyards, gardens and melon fields in the desert, has finally reached here. But the rush to develop the area's natural potential would be impossible without additional electricity. This will be provided by the 11th power unit at the Krasnovodsk TETs. The 210-megawatt unit has a greater output than the other 10 units already in operation. Things are very busy at the site now, with work proceeding around the clock to meet very tight schedules. "We are finishing

the pumping station and starting to install the transformers. The finishing workers have begun their work," said F. Agayev, director of administration Krasnovodsktetsstroy, "the work volume has recently doubled." Among the "hot" spots of construction are the settling ponds for industrial waste water. The Krasnovodsk TETs is indeed unique--it runs on desalinated sea water, which undergoes a number of complex chemical changes before being used in the boilers. [Text] [By A. Lenskiy] [Moscow TRUD in Russian 15 Dec 83 p 1] 12595

SAKHALIN RECEIVES POWER EQUIPMENT--Korsakov, Sakhalin Oblast (TASS)--The sea ferry "Sakhalin-5" made a special trip to Korsakov to deliver a generator stator and two transformers for the second phase of the Yuzhno-Sakhalinsk TETs. This was the first time that the Korsakov longshoremen had handled such heavy loads. They built a temporary railroad spur on the pier. Three flatbed rail cars were loaded with equipment using powerful "Uragan" cranes. Truck drivers will haul the equipment on special trailers from Gorkiy to the plant over a 40 kilometer road crossing forests and mountain rivers. [Text] [Moscow STROITEL'NAYA GAZETA in Russian 30 Sep 83 p 3] 12595

REGENERATOR INSTALLED--Khabarovsk Kray (TASS)--A heat regeneration unit has been installed at the nearly-completed TETs in Nikolayev-na-Amure. The unit, which supplies air into the combustion chamber, significantly reduces fuel consumption per unit of power generated. [Text] [Moscow SOTSIALISTICHESKAYA INDUSTRIYA in Russian 1 Oct 83 p 2] 12595

MOSCOW'S YUZHNAYA TETS AUGMENTED--Today, complex testing of a large unit was completed at the "Yuzhnaya" TETs. The newest TETs in the capital has been rapidly increasing its output. Construction is still continuing while heat and electricity are being produced. In the future it will be a giant, unequalled in the USSR or Europe. "Our TETs, although it is officialy No 26, is still universally known as "Yuzhnaya" [Southern], the enterprise's chief engineer, N. Kutskiy, told this correspondent. "It is a fitting name, since we supply heat and electricity to apartment buildings and supply electricity to industries in the southern part of the capital." In the near future, two million Muscovites will receive heat and light from the Yuzhnaya plant. It was only comparatively recently that the first two 80,000-kilowatt power units were started up. And now a new 250,000-kilowatt unit is connected to the Mosenergo system. The TETs collective has a busy schedule ahead of it, installing and starting up new units. The first phase alone of this giant includes five power units and seven hot-water boilers. [Text] [Moscow VECHERNYAYA MOSKVA in Russian 6 Jan 84 p 1] 12595

VILNIUS TETS-3 WORK PROCEEDING--Power and heat supply for the Lithuanian capital will be significantly improved when the first power unit of the Vilnius TETs-3 goes into operation. Over 100 subcontractor organizations have been aiding the general contractor, the TETs-3 Construction and Installation Administration, in the construction of this most important power project. They have solved a number of difficult technical problems involved in installing the unique equipment and protecting the environment. In particular, a special concrete formula from Orgtekhstroy, of the

Construction Ministry, was used at the ZhBK-3 plant to produce concrete for the 250-meter-high smokestack. The construction work has entered a new stage--building a second identical power unit. [Text] [By V. Tumanov] [Moscow STROITEL'NAYA GAZETA in Russian 15 Jan 84 p 3] 12595

BAYPAZINSKAYA GES TURBINE INSTALLATION--Nurek--At the construction site of the Baypazinskaya GES in Tajikstan, the brigade of USSR State Prize laureate A. Shil'nikov, of the Spetsgidroenergomontazh All-Union Trust, has begun assembling the hub of the first turbine of the GES. The construction workers received this unit and all related components of the first turbine exactly on schedule from their friends at the Kharkov Turbine Plant. At the same time, their old partners in the "workers' relay-race" promised to deliver the turbine spindle and impeller in the shortest possible time. The 600,000-kilowatt GES, the sixth on the mountain river Bakhsh, is presently in the pre-start-up phase. A great deal of concrete work is now ready to be done. The first cubic meter of concrete will soon be poured into the permanent dam. [Text] [By S. Smirnov] [Moscow SOTSIALISTICHESKAYA INDUSTRIYA in Russian 18 Nov 83 p 1] 12595

FIRST VARIABLE-OUTPUT TURBINE--Kharkov (TASS)--A new turbine unit, developed by Kharkov specialists in conjunction with Leningrad scientists, is capable of regulating its power generation as consumer demand varies. Yesterday, the first such machine, featuring a wide power range and easy adjustability, was shipped from the Kirov Plant to the Shulbinskaya GES in Siberia. "This is an important step toward the creation of a uniform series of powerful hydroturbines," said Professor A. Podgorniy, director of the Institute of Machine-Building Problems of the UkSSR Academy of Sciences. "The rated power of the first turbine, 230,000 kilowatts, is a world record for this type of turbine. The adjustable turbine blades are of very high strength and can easily adjust their angle to the water flow. They are automatically controlled with great precision to ensure the most effective use of hydroelectric power." [Text] [Moscow SOTSIALISTICHESKAYA INDUSTRIYA in Russian 26 Jan 84 p 2] 12595

JOINT ROMANIAN-YUGOSLAV GES--SRR [Socialist Republic of Romania]--The "Iron Gate-P" GES, being built on the Danube by Romanian and Yugoslav workers, is a symbol of cooperation between socialist countries. Technical assistance is being provided by the USSR. Sixteen 27-megawatt hydropower units will be installed in the new GES. "Iron Gate-P" is scheduled to reach its rated power of 430 megawatts in 1984. [Text] [Baku VYSHKA in Russian 2 Feb 84 p 3] 12595

GENERATOR FOR KOLYMSKAYA GES--Novosibirsk--Thirty-five flatbed rail cars were needed to ship the latest hydrogenerator built by the Sibelektrotyazhmash Plant collective to the Kolymskaya GES. Transporting the generator to the country's most northerly GES is in itself a difficult operation. Parts for the next unit are being shipped to the site today. On the threshold of the new year, the builders of the Cheboksarskaya GES will receive the most important units for their 13th hydrogenerator. The Sibelektrotyazhmash workers have completed ahead of schedule two recently-developed motors for a thermal power plant under construction in the northern Urals. [Text] [By A. Lyakhov] [Moscow SOTSIALISTICHESKAYA GAZETA in Russian 14 Dec 83 p 2] 12595

KOLYMSKAYA SPILLWAY DESIGN--The collective of the Lengidrostal' Special Design Bureau has finished designing the mechanical equipment for the Kolymskaya GES spillway. "It is designed to handle floodwater rates up to 11,700 cubic meters per second," said Chief Engineer N. I. Derkach. "The overflow has three outlets, which are closed by a unique segmented floodgate, the only one of its kind in a domestic GES." Because of the design, much less rock will have to be removed from the cliffs, reducing construction time and saving several million rubles in construction costs. [Text] [By V. Bashayev] [Leningrad LENINGRADSKAYA PRAVDA in Russian 27 Dec 83 p 4] 12595

CHERNOVITSK GES NEARING COMPLETION--Chernovitsy Oblast--It was not too long ago that people spoke of the large series of hydroelectric stations on the Dniester River in the Chernovitsy Oblast as a project of the future. Today, both banks of the river are connected by the GES. Installation of the sixth and final generator is now being completed. Using large-scale assemblies in the construction process, the workers are ahead of schedule in order to fulfill their obligation to put the generator on-line by the end of the year. At the same time, the construction collective started a new labor "relay-race." Below the GES dam, the first cubic meter of earth was ceremoniously removed for the foundation of yet another important project for the next phase of the series: a pumped-storage electric power plant. [Text] [By V. Vukovich] [Moscow IZVESTIYA in Russian 12 Dec 83 p 1] 12595

CSO: 1822/168

NOVEMBER PROGRESS REPORT ON GAS PIPELINE

Moscow EKONOMICHESKAYA GAZETA in Russian No 50, Dec 83 p 3

[Article by A. Panin: "In November on the Gas-Pipeline Rights-of-Way"]

[Text] The 11th Five-Year Plan has provided for the construction of six gas pipelines from the northern rayons of Tyumen Oblast into the country's European part. Of these, the following four mainlines were put into operation during the years 1981--1983: Urengoy--Gryazovets--Moscow, Urengoy--Petrovsk, Urengoy --Novopskov, and Urengoy--Pomary--Uzhgorod. All the gas-transport systems were introduced ahead on schedule, while the line section of the Urengoy Gas Pipeline was completed almost half a year ahead of the deadline set by the plan. Of particular importance now is putting the compressor stations into operations on this mainline; they must be introduced during the current year in accordance with Plan 17. These stations are being erected by organizations of the USSR Ministry of Construction of Petroleum and Gas Industry Enterprises, USSR Ministry of Heavy and Transport Machine Building, USSR Ministry of Construction, USSR Ministry of Power and Electrification, and USSR Ministry of Industrial Construction. Material and technical resources, as well as installation brigades have been concentrated at all the construction sites.

On the whole, operations are being carried out in accordance with the outlined plans. Three stations have already begun functioning on the gas pipeline; during the course of December other gas-compressor stations will go on line in sequence. At the same time there is cause for concern over the lag in building the Urengoy and Lyalinsk Compressor Stations in Tyumen and Sverdlovsk Oblasts. At this pre-start-up stage it is particularly important to maintain precision and a good organizational quality in the tune-up operations and in finishing up construction matters in accordance with the start-up complexes, as well as to intensify work on the lagging sections. It is all the more important now that December--the final month of the year--has arrived that we have operational coordination and good results; these will determine the results of the socialist competition.

The capacities for pipeline construction which have been created by the Ministry of Construction of Petroleum and Gas Industry Enterprises allow us to maintain a rapid pace in constructing two more gas pipelines planned during the current five-year plan: Urengoy--Center-I and Urengoy--Center II. The builders working under the Ministry of Construction of Petroleum and Gas Industry Enterprises have confirmed this by their practical deeds.

In a well-organized manner and within compressed time periods they have switched their own capacities over to building these mainlines, and, by utilizing the abundant experience previously accumulated, they are carrying out the construction of these lines ahead of schedule. The production lines of the Construction of Pipelines in Siberia Main Administration, Pipeline Construction in the Eastern Regions Main Administration, and the Pipeline Construction Main Administration, which are working on these gas pipelines, are striving to mark the concluding phase of the third year of the five-year plan with new labor successes.

As of 1 December, 1,790 kilometers of pipe had been hauled onto the construction right-of-way of the Urengoy--Center-I Gas-Transport System with its length of 3,020 kilometers; almost 1,600 kilometers of pipeline had been welded into the "thread," and 1,340 kilometers of pipeline had been insulated, while 1,360 kilometers of trench had been dug open. The composite pace of constructing the Urengoy--Center-I Gas Pipeline, as of 1 December, exceeded the pace of building the Urengoy--Uzhgorod Gas Pipeline, on the whole, by 280 kilometers, and for the month of November--this figure was 46 kilometers.

Steady, rapid rates of building this mainline have been maintained by the integrated production lines headed up by A. Buyankin (the Mosgazprovodstroy Trust), Ye. Shakhov (the Soyuzgazapetsstroy Trust), V. Belyaeva (the welding and installation trust), L. Mikhel'son (the Kuybyshevtruboprovodstroy Trust). From July through November of the current year these lines took first-class places in the competition 7 or 8 times each. A. Buyankin's line fulfilled its socialist pledges in honor of the 66th Anniversary of the October Revolution; it was the first to complete construction of the 97-kilometer section of the mainline; following it, Ye. Shakhov's line finished the line work on the mainline.

The Collegium of the Ministry of Construction of Petroleum and Gas Industry Enterprises and the Presidium of the Central Committee of the sectorial trade union in November approved the initiative put forth by the groups of the Pipeline Construction Main Administration, the Construction of Pipelines in Siberia Main Administration, the production lines of the Tatnefteprovodstroy and Omskneftеprovodstroy Trusts of the Pipeline Construction in the Eastern Regions Main Administration, and the Soyuzpodvodtruboprovodstroy Association for completing ahead of schedule construction on the line section of the Urengoy-Center-I Gas Pipeline in March 1984.

Work has also gone forward on construction of the Urengoy--Center II Right-of-Way. The onset of frosts, particularly in the difficult-to-reach, swampy rayons of Tyumen and Sverdlovsk Oblasts, is improving the passability of the bogs and allowing us to significantly step up the pace of operations on the right-of way. At present one of the most important tasks for the builders' groups is to ensure the putting into operation of the planned compressor stations.

2384
CSO: 1822/179

DECEMBER PROGRESS REPORT ON GAS PIPELINES

Moscow EKONOMICHESKAYA GAZETA in Russian No 2, Jan 84 p 17

[Article by V. Vozniyak: "In December on the Gas-Pipeline Right-of Way"]

[Text] In the concluding month of 1983 a number of compressor stations on the Urengoy--Pomary--Uzhgorod Gas Pipeline were scheduled to be put into operation in order to fully utilize the advantages of the winter period for laying the sections of the Urengoy--Center-I Mainline, which pass through swampy territory. The builders successfully coped with this task.

Tests were conducted, along with the tune-up and trial run of the equipment at the compressor stations of the Urengoy--Pomary--Uzhgorod Gas Pipeline with the new Soviet GTK-25 and GPA-Ts-16 units. Among the first to complete these operations were the Zavolzhskaya Compressor Station in the Chuvash ASSR, under the direction of construction organizations of USSR Ministry of Power and Electrification, and the Grebenkovskaya Station in Poltava Oblast, built by the USSR Ministry of Industrial Construction. A number of compressor stations equipped with GPA-Ts-16 units have been successfully put into operation by builders under the Ministry of Construction of Petroleum and Gas Industry Enterprises in Tyumen Oblast.

Particularly outstanding in December was the work of the groups of the integrated production lines under the Ministry of Construction of Petroleum and Gas Industry Enterprises on building the Urengoy--Center-1 Gas Pipeline. During this month 565 kilometers of pipe were welded into the "thread" on this right-of-way, and about 630 kilometers were insulated. Thus, 1.6 times as much welding work and almost double the amount of insulation work were carried out as compared with the preceding month.

The results obtained also exceed the pace achieved by the Ministry of Construction of Petroleum and Gas Enterprises' builders in the construction of the Urengoy--Pomary--Uzhgorod Gas Pipeline in December 1982 (by comparable sections).

By the beginning of 1984 approximately 2,200 kilometers had been welded into the "thread," while 1,990 kilometers of the gas-transport mainline had been insulated and placed in the trench.

In December the foremost groups of the Pipeline Construction Main Administration completed the construction of the sections entrusted to them and engaged in conducting tests on the pipeline. Good work was done by the integrated production lines headed up by V. Belyayeva (welding and installation trust), A. Buyankin (Mosgazprovodstroy Trust), and L. Mikhel'son (Kuybyshevtruboprovodstroy).

Trusts from the most northern Construction of Pipelines in Siberia Main Administration began to work at full capacity in December. If, at the beginning of the month, the daily pace of the production lines of this main administration amounted to 6--7 kilometers, then in the last 10-day period it had already reached 10--12 kilometers. Successful work on the right-of-way has been done by groups of the integrated production lines headed up by A. Tsoy (Komsomol'sktruboprovodstroy Trust), M. Blinovyy (Severtruboprovodstroy), and R. Kolodzey (Kazymtruboprovodstroy).

In the construction of the underwater passageways for the gas pipeline outstanding work was done in December by the groups of the construction-and-installation sub-divisions of the Soyuzpodvodtruboprovodstroy Association. They have practically completely finished construction of the underwater pipelines across the rivers on the entire right-of-way over the territory of the country's European part. They have carried out large-scale preparatory operations for laying the sag pipes across the major Siberian rivers--the Ob', Kazym, and Nadym.

The labor zeal in constructing the main gas pipelines, the work pace attained in December, must be maintained during the first quarter of 1984. The builders have every opportunity to put the Urengoy--Center-1 Gas Pipeline into operation ahead of schedule in March 1984, as well as to speed up the construction of Urengoy--Center-II.

It is important on all the projects under construction to create a situation of mutual high standards and discipline, as well as to develop on a broader basis socialist competition for the introduction of capacities ahead of schedule.

2384
CSO: 1822/175

BRIEFS

URENGOY--CENTER-I GAS PIPELINE--Construction of the section of the Urengoy--Center-I Gas Pipeline which passes through the territory of Perm' Oblast is going forward at a shockwork pace. Groups of the specialized administrations of the Novosibirsktrubovodstroy Trust and the Bashkir Nefteprovodmontazh Trust are carrying out installation and construction operations ahead of the schedule and at a high level of quality. [Text] [Moscow SOTSIALISTICHESKAYA INDUSTRIYA in Russian 10 Jan 84 p 1] 2384

KHOLMOGORY--KLIN PETROLEUM PIPELINE--Nefteyugansk (Tyumen' Oblast). The advance across the Ob' has been begun by the builders of the Kholmogory--Klin Petroleum Pipeline. They have laid the first sag-pipe runner on the bottom of the river. By Siberian standards the width of the water obstacle is not too great here--amounting to 900 meters. But in this place the river has a certain characteristic--low, swampy banks--which prevent people from passing over, not to mention equipment. Therefore, the banks had to be reinforced; man-made installation areas had to be built. [Text] [Moscow TRUD in Russian 24 Dec 83 p 1] 2384

GAS PIPELINE TO BUKTYL--Gas has begun to be delivered through the 80-kilometer pipeline connecting the new Western Soplessk gas condensate deposit with Buktyl. It is here that the new gas flow will merge into the Northern Lights Mainline. Several billion cubic meters of the "blue fuel" will be delivered every year through this gas pipeline. [By V. Krukovskiy, special correspondent] [Text] [Moscow SOTSIALISTICHESKAYA GAZETA in Russian 3 Dec 83 p 2] 2384

RUNYA--MOKSHA SECTION OF GAS PIPELINE--Krasnoslobodsk (Mordovian ASSR). The line section of the Urengoy--Center-I Gas Pipeline in the area between the rivers from Rudnya to Moksha is ready to transport natural gas from Siberia. Yesterday its testing was completed by a detachment from the Moscow Welding and Installation Trust. On the reinforced, 123-kilometer stretch this group laid the "thread" of large-diameter pipes ahead of schedule. [Text] [Moscow TRUD in Russian 12 Jan 84 p 1] 2384

SVERDLOVSK SECTION OF GAS PIPELINE--Ivdel' (Sverdlovsk Oblast). The first few runners for the large-diameter pipes have been laid on the Sverdlovsk Section of the Urengoy--Center-I Gas Pipeline. Utilizing the experience of building the transcontinental Urengoy--Pomary--Uzhgorod Right-of-Way, the welders and operators of the pipe-laying machines precisely planned their operations right at two construction sites. [Text] [Moscow TRUD in Russian 25 Dec 83 p 1] 2384

LIPETSK OBLAST SECTION OF GAS PIPELINE--Builders of the fuel artery to be started up in the fourth year of the five-year plan--the Urengoy--Center-I Gas Pipeline--continue to increase their work pace. Some 2,500 kilometers have already been covered from the Western Siberian gas deposits to Yelets in Lipetsk Oblast. Over all this distance the pipes have been welded, insulated, and laid in the trench. Only 300 kilometers of the right-of-way remains to be laid. In February 1983 the first kilometers of the Urengoy--Center I Mainline were welded into the "thread." The builders prepared for the beginning of operations well ahead of time: the equipment was checked out, and the necessary supply of pipes was hauled out onto the right-of-way. All the gas pipelines from Urengoy have been laid within the so-called "unified energy corridor"--a section several dozen kilometers in width. As a result, after construction was completed on one mainline, it has not been necessary to transport the equipment over long distances, and the possibility emerged of using the previously created production base. In adopting their socialist pledges for the five-year plan, the workers under the Ministry of Construction of Petroleum and Gas Industry Enterprises resolved to lay all the rights-of-way from Western Siberia ahead of schedule. They have kept their word in good faith. As examples of this, we may cite the fuel mainlines from Urengoy to Moscow, Petrovsk, Novopskov, and Uzhgorod, all finished before their deadlines. (TASS) /Text/ /Moscow PRAVDA in Russian 14 Feb 84 p 2/ 2384

SVERDLOVSK SECTION OF GAS PIPELINE--A great achievement has been attained by the specialists of the Novosibirsktrubovodstroy Trust. Working under complicated conditions on the Sverdlovsk Section of the Urengoy--Center-I Gas Pipeline, they laid 26 kilometers of pipe during a 20-day period. This is one of the best results in the sector. The group achieved its rapid pace thanks to a precise organization of its insulating and laying operations. While utilizing the experience gained from the kilometers already covered by this export gas mainline, the workers on this right-of-way applied a number of innovations which allowed them to speed up the laying of pipes through extremely swampy areas. It has been resolved to lay 46 kilometers more of the steel "thread" by the day of elections to the USSR Supreme Soviet. /By Yu. Yevsikov/ /Text/ /Moscow STROITEL'NAYA GAZETA in Russian 15 Jan 84 p 3/ 2384

TESTING GAS PIPELINES--Pomary--Three months before the deadline the signal sounded to begin hydraulic tests on the Mariy Section of the Urengoy--Center I Gas Pipeline. Today units were switched in, pumping water into the multi-kilometer underground mainline. It is not only the steel "thread" intersecting forests, swamps, and gullies which is being tested for strength. This is also a check-up on the skill of the specialists from the Tatneftegazprovodstroy Trust--welders, pipeline-layer-operators, and insulation workers, who were able to lay the right-of-way within time periods compressed to the maximum. This segment of the gas pipeline is being subjected to loads greatly in excess of those used in actual operations. Monitoring controls over the right-of-way tests are being conducted not only with the aid of instruments but also visually--from helicopters. The trust's builders intend to turn this section of the gas pipeline over to the operations personnel during the current year. --Sverdlovsk--Tune-up operations have begun on the last gas-pumping turbine of the Novo-Lyalinsk Compressor Station of the Urengoy--Pomary--Uzhgorod Gas Pipeline. Being tested here is a new variant of placing machinery--not in a common building but separately. The turbine units, manufactured by the

Nikolayevsk machine-builders, do not require major housings. This provides considerable savings on the building materials being shipped in from far away, as well as a reduction in capital investments, labor outlays, and construction deadlines. The experience gained in creating the Novo-Lyalinsk Compressor Station, which the workers have resolved to put into operation by New Year's, will be applied in the construction of the Urengoy--Center-I and Urengoy-II Gas Pipelines. [Text] [Moscow SOVETSKAYA ROSSIYA in Russian 9 Dec 83 p 1] 2384

SYRDAR'INSKAYA GRES--TASHKENT GAS PIPELINE--Tashkent, 6 Jan (TASS)--Natural gas from the underground deposits of the Karshinskaya Steppe arrived today at the capital of Uzbekistan. The 204-kilometer Syrdar'inskaya GRES [State Regional Electric Power Station]--Tashkent Gas Pipeline has been put into operation. Thanks to the new mainline, the industry of the Tashkent zone will already receive during the current year additional billions of cubic meters of natural fuel. It has now become possible to significantly increase the production of electric power, cement, and copper. By the end of the five-year plan deliveries of fuel from the deposits in the Karshinskaya Steppe to the capital of Uzbekistan and the adjacent regions will increase by a factor of almost 1.5. [Text] [Moscow PRAVDA in Russian 7 Jan 84 p 2] 2384

CSO: 1822/175

MEAT, DAIRY INDUSTRY SETS STANDARDS FOR FUEL, POWER UTILIZATION

Moscow MOLOCHNAYA PROMYSHLENNOST in Russian No 12, Dec '83 p 8-10

[Article by Engineer V. V. Mikhov of the USSR Minmyasomolprom [Meat and Dairy Industry Ministry]: "Effective Utilization of Fuel and Power Resources"]

[Text] The meat and dairy industry is a large consumer of fuel and power resources. The planned consumption for 1983 is 8.3 million tons of furnace fuel, 51 million Gcal of thermal energy and 7.2 billion kwh of electric energy. In connection with the increased volumes and growth of the power supply per production unit, this year the fuel demand increased 1.57 times and the demand for thermal and electric energy increased 2.5 and 2.3 times, respectively, over that of 1965.

One of the industry's important tasks is to increase the effectiveness of utilization and all manner of conservation of fuel and power resources. Its solution should be the center of attention of the branch's power service collectives, which number more than 50,000 people.

As noted in the speech of General Secretary of the CPSU Central Committee Comrade Yu. V. Andropov at the November (1982) Plenum of the CPSU Central Committee, the economy, the diligent attitude towards the national good, is a question of the reality of the nation's plans. The given fundamental indication relates directly to the energy service workers of the meat and dairy industry.

In the 10th Five-Year Plan the industry consistently failed to fulfill plans for conservation of fuel and energy resources. Many enterprises did not pay proper attention to their careful utilization.

Recently the situation has somewhat improved. In the first half of 1983 the plan for conserving energy resources was fulfilled.

The ministry has established basic directions for more effective utilization of the branch's fuel and energy resources. The most important of these are: development and introduction of engineering processes requiring less specific energy consumption, improvement in the same plan of design solutions for new and renovated enterprises, technical reequipment of the energy systems, wide use of secondary energy resources for industrial and consumer needs, reduced consumption for refrigeration of products, replacement of obsolete and unproductive with new and modernized equipment, development of socialist competition to conserve fuel and energy resources, and wide dispersal of the superior know-how of enterprises which have achieved the best results.

Particular attention is being devoted to the reequipment of boiler houses, of which there are over 6,000 in the industry. Only in the last 5 years 3,310 steam boilers of a new design, 3,330 sets of equipment for automatic heating control and about 6,100 calculating and monitoring instruments were installed in place of obsolescent equipment; over 580 boiler houses were converted for use of more advanced types of fuel, and routine adjustments was performed on 2,410 boilers, accompanied by presentation of operating performance cards. All this made it possible to increase the efficiency factor of boiler installations from 77 (1975) to 82 percent (1982) over the indicated period.

Enterprises of the meat and dairy industry have considerable resources of secondary heat. In order to maximally involve them in production, the Thermal Technology Department of the Moscow Engineering Institute of the Meat and Dairy Industry developed appropriate technical materials which were delivered to the enterprise.

Much importance is attached to the better utilization of condensate. Its return to the boiler rooms increased 40 percent since 1975. It is also used to heat water in production shops.

In the last 2 years 220 economizers and air preheaters were installed in order to utilize the thermal energy of waste gases at enterprises.

Enterprises producing condensed and dry milk products have at their disposal substantial heat reserves in the form of the slag steam condensate of vacuum evaporators and the exhaust of spray dryers. If we should succeed in including fully the mentioned heat in production, we would conserve about 55,000 Gcal (10,000 tons of fuel) of thermal energy, up to 500,000 kwh of electric energy and up to 1 million m^3 of water.

Enterprises of the VPO [Military Consumer's Society] Soyuzkonservmoloko make rather wide use of the slag steam condensate of vaccuum evaporators to feed steam boilers, heat milk and washing solutions for centralized washing systems, replenish heating systems and other purposes. However, enterprises using slag steam in production run a definite risk. The fact is that, due to the lack of instruments for determining the purity of slag steam condensate in the flow, condensate contaminated by milk may be let through. Production of the instruments is planned to begin only in 1987-1989. It is essential to speed up mastery of their production.

In order to use the secondary heat of dryers, Czechoslovak specialists developed a recuperative heat exchanger, the experimental model of which will be tested this year at the Kalinin Dairy Combine. In the event of positive results, all spray dryers producing 1,000 kg of water vapor per hour and obtained from Czechoslovakia will be fitted with these units over several years. It is also necessary to improve the thermotechnical indicators of AL-ORCh spray dryers for 500 kg/h of water vapor, which are produced by the Kalinov plant.

The meat and dairy industry spends more than 50 percent of the electric power it utilizes for refrigeration. Specialists of the VNIKTIKholodprom [not further identified], together with workers of associations and enterprises, are seeking a way to cut these expenditures by enlisting natural sources and cold air storage. Experimental models of automatic installations for cooling water by means of natural cold air during winter were recently tested. Their serial production will be organized in 1984.

Storage of cold air for consumption during peak loads in production is finding increasingly wider use. This also reduces the fixed capacity of refrigerator compressors. Over 1981-1982, 115 such systems were introduced.

It is acknowledged that the main part of fuel and energy conservation may be achieved as a result of the development and wide use of new energy-saving techniques, equipment and materials. According to data of the GKNT [State Committee on Science and Technology], this will generate a potential saving in the national economy of up to 70 percent.

In the meat and dairy industry intensive work is under way to replace obsolete machinery, and new types of products and technological processes are being introduced. During 1981-1982, 163,000 mechanized flow lines and other equipment were installed at enterprises. However, this work is not effective enough. Due to the introduction of progressive technological processes and equipment, the amount of thermal and electric energy conserved by the 1983 plan is only 7.8 and 5.2 percent, respectively, which is insufficient. Fundamentally new techniques and machines are needed, which should be developed by branch scientific-research and design-development organizations and machine builders.

Socialist competition for conservation of energy resources is widening in the branch. Every year, jointly with the Central Committee of the trade union of food industry workers, the USSR Minmyasomolprom sponsors an All-union Public Review of the effective use of raw materials, materials and fuel and energy resources. Among the winners last year were the collectives of the Leningrad, Chimkent, Tbilisi and Donetsk production associations of the dairy industry, the Kokand Dairy Plant, the Yerevan and Pyarnu combines, the Kishinev Refrigerator Combine and the Borisov Polimiz Plant. The majority of mentioned enterprises are operating stably this year as well.

Good results are being achieved during socialist competition in 1983 by the collectives of the Moscow Oblast, Voroshilovgrad and Beltsy production Associations of the dairy industry, the Istra Association of Children's Dairy Products, the Kustanay Municipal Dairy Plant, the Irkleyev Butter-and-Cheese-making Enterprise and many others.

The consumption indicators of fuel and energy resources for 1982 and January to August of this year would have been significantly better had it been possible to avoid serious shortcomings in fuel and energy utilization. Inspections show that at a number of enterprises energy losses are high, record keeping is poorly organized, the operating procedure of energy-using equipment is violated and poor management is tolerated.

In spite of the favorable work conditions of enterprises this year, the ministries of the meat and dairy industry of the RSFSR and Kirghiz SSR permitted excessive consumption of fuel. As a result, energy conservation plans were unfulfilled in the branch as a whole. At some enterprises, especially those in Estonian SSR, the role of normalizing consumption of of energy resources is minimized and planned discipline is irregular.

The five-year plan for 1981-1982 stipulates in the meat and dairy industry a reduction of consumption and conservation quotas of no less than 3 percent for fuel, 5 percent for thermal energy and 4.1 percent for electric energy. Although strenuous, the task is realistic. The branch's energy workers should make every effort to solve the task and contribute to the realization of the USSR's Food and Energy Program.

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CSO: 1822/115

LONG-RANGE GOALS OF USSR ENERGY PROGRAM STATED

Moscow EKONOMICHESKAYA GAZETA in Russian No 12, Mar 84 pp 11-14

[Text] Throughout the entire history of the Soviet State, the Communist Party has attributed primary importance to the development of power engineering and particularly electrification as a paramount condition for building socialism and communism.

Under the party's guidance all the key directions for the development of power engineering operations were elaborated. They were reflected in the resolutions of the party congresses and CPSU Central Committee plenums, and in other major party documents.

The Communist Party organized the implementation of large-scale programs and plans for development of the fuel industry and electric power engineering. Under its guidance the first long-range program in the world for the development of the USSR national economy on the basis of electrification (GOELRO [State Commission for the Electrification of Russia] Plan) was fulfilled and overfulfilled, and vast work was also done for rehabilitation in the postwar period and a further increase in the country's fuel-power engineering base and improvement in the structure of the power engineering balance.

As a result of the selfless labor of the Soviet people, a powerful, highly efficient fuel and power engineering complex was established in the USSR.

The USSR is a unique, large industrially developed country, which is totally self-supplying with fuel and energy by virtue of its own natural resources, and exports fuel and electric power in sizeable volumes.

At the present stage of communist construction, the role of the fuel-power engineering system is particularly increasing.

It was emphasized at the 26th CPSU Congress that the development of heavy industry, and primarily of its base sectors such as fuel-power engineering, is one of the unconditional prerequisites for solving all the national economic problems. Particularly noted was the urgency of improving the structure of the country's power engineering balance, reducing the portion of petroleum used in it as fuel, replacing it with gas and coal, of accelerated development of nuclear power, including fast-neutron reactors, and continuing the search for energy sources new in principle, including establishing the

bases for thermonuclear power engineering. Noted as tasks of primary economic and political importance in the 80's were a rapid increase in extraction of gas and oil in Western Siberia and ensuring their transport to the European part of the country.

The November (1982) CPSU Central Committee Plenum made an important contribution to working out these national economic problems. It was pointed out at the Plenum that it is very important to use coal, natural gas, oil, petroleum products and thermal and electric power economically. This requires a certain reorganization in all sectors and firstly wide-scale introduction of energy-saving equipment and processing methods, improvement of accepted standards, use of material and moral incentives in the struggle for economy and a more strict answering for overspending and exceeding norms and limits.

All of these ideas formed the basis for drawing up the USSR Power Engineering Program with a long-range perspective.

The USSR Power Engineering Program is based on preliminary estimates of the development of the Soviet Union economic system up to the year 2000, and defines the scientifically based principles, chief directions and most important measures for expanding the power engineering base and a further qualitative improvement in the country's fuel and power engineering system. At the same time, the program should be given more precise definition before the next five-year plan, so that it is determined in consideration of the growth of the country's economic system and the level and direction of development of the sectors in the fuel-power engineering complex in the next 20 years.

Putting the USSR Power-Engineering Program into practice is one of the necessary conditions for accelerating the transition of the country's system onto an intensive path of development, will permit a substantial increase in the power available per productive unit of the sectors of the national economy, particularly the agro-industrial system, and will contribute to the successful fulfillment of the USSR Food Program.

The presence in the USSR of considerable natural power resources, and powerful production and scientific-technical potential combined with the advantages of a planned system for conducting the economy ensures the Soviet Union and all the socialist commonwealth superiority in the competition with the capitalist countries.

1. Basic Premises of the USSR Power Engineering Program for the Long-Range Future.

The basic premises of the USSR Power Engineering Program stipulate:

Carrying out an active energy-saving policy based on accelerated scientific-technical progress in all sections of the national economy and in everyday life, the utmost saving of fuel and energy and ensuring on this basis a considerable reduction in the relative energy-intensiveness of the national income;

Accelerating technical progress in the sectors of the fuel-power engineering complex, as well as in the machine building and other related sectors of industry which supply this complex with equipment, machines and materials;

Ensuring advancing growth rates in the production of electric power, as compared with the growth rates for extracting and producing primary power resources;

Accelerated development of the gas industry to satisfy the country's domestic needs and export needs;

Ensuring a stably high level of oil extraction, including that due to increasing the oil yield of the strata;

Timely preparation of industrial reserves of fuel, particularly oil, a sharp increase in volume and rise in efficiency of deep exploratory drilling for oil, primarily in the most promising regions;

Ensuring a rise in motor fuel resources, first of all by virtue of increasing the volume and depth of oil refining, with a simultaneous substantial reduction in mazut input by electric power stations, and also by wide-scale use of compressed and liquefied natural gas as motor fuels and organizing, as scientific-technical problems are solved, the production of synthetic motor fuels made of gas, coal and oil (combustible) shale;

High-speed development of nuclear power engineering for the production of electric and thermal energy and release on this basis of a considerable amount of organic fuel, and construction of hydraulic accumulation electric power stations as maneuvered capacities in the European part of the country;

Development of the coal industry primarily by virtue of increasing the extraction of coal by the open method in the eastern regions and accelerated construction of powerful thermal electric power stations using this coal;

Economically substantiated comprehensive development of hydroelectric power resources in Siberia, the Far East and Central Asia;

Establishing the technical and material base for wide-scale use of fast neutron reactors, secondary nuclear fuel, thorium and its compounds, power from thermonuclear synthesis, and also nontraditional renewable sources of energy, including solar, geothermal, tidal, wind power and biomass;

Optimum combination of various methods of transport to the European part of the country of a large amount of power resources from the eastern regions, chiefly from Siberia, where the basic increase in the volume of organic fuel extraction will be ensured;

Increasing the reliability of fuel and energy supply through establishing the necessary reserves of production capacities in the sectors of the fuel-power engineering system;

Ensuring the export of fuel and electric power in the necessary quantities, first to solve energy problems in conjunction with the filial socialist countries, and also for efficient participation in international division of labor.

Putting the USSR Power Engineering Program into practice presupposes:

Increasing in the overall volume of national economic input the portion of material and financial resources directed to the fuel-power engineering complex and the sectors of industry providing this complex with equipment, machines and materials;

Further improvement in positioning the country's productive forces, directed toward bringing them closer to the main fuel-power engineering bases of the USSR;

Improving the administration and raising the level of management for production in the sectors of the complex.

Implementation of the USSR Power Engineering Program is estimated for two stages. The first stage will be completed at the boundary of the 80's and 90's. At this stage the problems of reliable energy provision for the USSR national economy will be solved by maintaining high levels of oil extraction, a rapid increase in the volumes of extracting Siberian gas and transporting it to the European part of the country and accelerated development of nuclear power engineering. In this period the necessary prerequisites will be formed for intensive increase of coal extraction in the next few years, and the conditions will also be prepared for wide-scale transition of the economic system onto a power-saving path of development.

At the second stage, which will be completed at the boundary of the 20th and 21st centuries, the power engineering efficiency of social production will rise at increasing rates on the basis of intensive power conservation and acceleration of scientific-technical progress. In the middle of this stage gas extraction will reach the maximum level assigned by the program, and will be stabilized, while further increase in power resources will be ensured mainly by virtue of nuclear power production, coal extraction using the open method and also the use of renewable energy sources.

The Soviet Union will direct its efforts toward developing collaboration with the CEMA member countries in the field of power engineering in accordance with the following basic directions:

Fulfilling a set of measures for economical and efficient use of power carriers, reduction of the energy intensiveness of national production, in particular through a rise, on the basis of international cooperation, of the technical level of all types of power-consuming equipment;

A change in the structure of power resource production directed first of all toward more complete satisfaction of the energy demands of each of the CEMA

member countries by virtue of accelerated development of nuclear power engineering, broader use of internal resources of solid fuel, including low-calorie, and also drawing into the power engineering balance new sources of energy and organizing the production of synthetic liquid fuel made of coal and shale;

Intensifying work to put into effect the earlier adopted Long-Term Program for the special purpose of collaborating to supply economically substantiated needs of the CEMA member countries for basic types of energy, fuel and raw materials in the period up to 1990, in consideration of putting into practice the energy-saving policy, as well as working out additional measures to expand collaboration in this area.

The Soviet Union will henceforth carry out work on the further development of mutually beneficial economic and scientific-technical collaboration with the industrially developed capitalist countries, especially with the countries of Western Europe and with Japan, in solving power engineering problems, which is fully in line with the Program for Peace in the 1980's, advanced at the 26th CPSU Congress.

2. Improving the Structure of the Power Engineering Balance and Saving Fuel and Energy

The USSR Power Engineering Program specifies, in consideration of the new developmental conditions of the country's power engineering, a fundamental improvement in the structure of power-consumption, by:

Saving fuel and energy in all spheres of the national economy, primarily by virtue of improving production technology and designing and introducing energy-saving equipment, machines and assemblies;

Reorganizing the structure of the economic system in the direction of reducing the relative power-intensiveness of national production;

Substituting natural gas for liquid fuel, increasing the production of converted forms of energy, produced on the basis of nuclear power and coal, and also expanding the use of secondary and nontraditional renewable sources of energy.

The saving of power engineering resources should be implemented in the following basic directions:

Transition to energy-saving production technology, reducing its material-intensiveness and raising the organizational level of the production processes;

Improving power engineering equipment, dismantling and rebuilding obsolete equipment and designing and introducing into production transport facilities, machines and mechanisms that are more efficient with respect to power engineering;

Reducing all types of power losses and raising the level of using secondary power resources;

Improving production structure and conversion and use of power engineering resources, including further centralization of energy conservation and the use of combined power-engineering-production processes.

In power engineering provision is made for substituting other energy carriers for organic fuel, firstly nuclear and hydraulic power.

Electric energy is assigned a particular role in freeing high-quality fuel. This consists of expanding the electrification of thermal processes in industry and using the electric drive of gasline compressors.

Outlined at the first stage is substituting natural gas for considerable volumes of oil in the national economy and putting a stop to an increase in the input of organic fuel by thermal electric power stations in the European part of the country through advanced development of nuclear power engineering. At the same time the proportion of mazut in the overall input of power engineering resources by electric power stations should be cut by over half.

Along with supplanting mazut in the fuel balance of electric power stations, an oil saving will be achieved by transition of the motor vehicle fleet to diesel fuel, compressed and liquefied natural gas, further electrification of railroads and urban transport and increasing the production of liquid hydrocarbons as the result of a more intensive processing of natural gas. This will make possible, by the end of the first stage of putting the program into effect mainly to solve the extremely important problem of ceasing the increase in the consumption of petroleum fuel.

Increase in the organic fuel input for production of electric power and heat in the European part of the country will be ceased due to accelerated development of nuclear power engineering, construction of electric power transmission lines with super-high tension, increasing the use of secondary power resources, further centralization of heat supply and locating energy-intensive production facilities in the eastern regions of the country.

Implemented at the second stage will be:

Further high-speed development of the gas industry;

Establishment of a production base for reliable satisfaction of the national economy's demands for liquid fuel, including that achieved through organization of industrial production of methanol and synthetic liquid motor fuel;

Development of nuclear power engineering to a level at which the main part of the increase in the national economy's demand for electric power can be ensured;

Accelerating the development of the coal industry and stabilization and subsequent increase of the proportion of coal in the overall volume of liquid fuel extraction, with an increase in its use mainly at electric power stations:

Further drawing into the power engineering balance efficient hydraulic power engineering resources;

Establishing the technical base for using nontraditional renewable sources of power as an important means to solving local problems of power supply;

Solving the mainly technical problems of efficient transport of power resources over the large distances from the eastern regions to the European part of the country.

The overall demand for fuel and power engineering resources will be reduced by the end of the second stage by 940-1.080 million tons of standard fuel, including by 540-580 million tons due to a reduction in the relative input norms and other measures for saving them, and by 400-500 million tons through replacing organic fuel with other power carriers.

Locating new energy-intensive production facilities mainly in the eastern regions, continuing construction of super-high-tension electric power transmission lines and accelerating development in the European part of the country of nuclear power engineering will make it possible on the boundary of the 20th and 21st centuries basically to establish an increase in the transcontinental flows of organic fuel from East to West.

Putting into practice the USSR Power Engineering Program ensures accelerated rates for electrification of the national economy. The relative electric-intensiveness of the national income should rise by 5-6 percent in the first decade, and up to 15 percent--in 20 years. Simultaneously a further rise in the power consumption per capita is foreseen. By carrying out an active energy-saving policy, the process of reducing the relative power-intensiveness of the national income will be accelerated. In a 20-year period this indicator will be reduced by 12-17 percent.

3. Electric Power Engineering and Heat Supply

The following problems in the sphere of electric power engineering should be solved in the next two decades:

A reduction in the fuel balance of electric power stations, at first in the proportion of mazut, and then of natural gas, by virtue of constructing primarily nuclear electric power stations, thermal electric power stations using inexpensive coal extracted by the open method, and also large hydroelectric power stations mainly in the eastern regions of the country;

Completing the formation of a Unified Electric Power Engineering System in the country, with an increase in its maneuverability and reliability through the construction of peak electric power stations and super-high tension, direct current electric power transmission lines and improving the quality of the electric power supplied to the consumers;

Further development of combined production of electric and thermal power.

Increasing the generating capacities of the USSR Unified Electric Power Engineering System and improving their structure at the first stage will be ensured by construction of: large nuclear electric power stations in the European part of the country; powerful condensate thermal electric power stations using organic fuel in the eastern regions, particularly in Ekibastuz and the Kansk-Achinsk fuel-power engineering complexes, as well as electric power stations in Western Siberia based on natural gas; major hydroelectric power stations in the eastern regions of the country; thermal electric power stations for centralized heat supply to the consumers; electric power stations with highly maneuverable equipment (hydraulic accumulating, steam and gas and gas-turbine) primarily in the associations of the electric power engineering systems of the North-West, the Central Region and the South of the country.

At the first stage of putting the program into effect, the obsolete and low-efficiency equipment with an overall power of 55-60 million kilowatts at the electric stations should be dismantled and modernized. Intersystemic electrical connections will be further developed by constructing alternating current electric power transmission lines with a voltage of 1.150 kilovolts and 750 kilovolts, as well as direct current with a voltage of 1500 kilovolts. Most important of them are the Siberia-Kazakhstan-Urals lines with a voltage of 1.150 kilovolts and Ekibastuz--Central Region with a voltage of 1.500 kilovolts. The distribution networks with a voltage of 35 kilovolts and above are being expanded.

Provision is being made at the second stage to dismount and modernize, at the electric power stations, obsolete equipment with an overall power of 70-80 million kilowatts, including 55-60 million kilowatts at electric power stations in the European part of the country.

At this stage of development of the generating capacities of the USSR United Electric Power Engineering System, there will be carried out the following basic directions: in the European part of the country and in the Urals the scale of nuclear power stations will increase, the total power of the maneuvered equipment will be substantially increased and the combined production of electric and thermal power will be expanded, with an increase in the scales of nuclear central heating in the European part of the country; the construction volumes of large thermal electric power stations in the Kansk-Achinsk angles will increase; by the end of the stage the development of hydraulic power engineering resources in the eastern regions of the country will be brought to approximately half of their greatest economic potential.

At the second stage a unified system-forming electrical network should be established, made up of super-high tension electric power transmission lines.

Specified as the basic directions for the development of heat supply to the national economy and the country's population are:

Expanding centralized heat supply on the basis of further development of district heating and utmost concentration on heat production with a view to stopping the growth, and in the future--reducing the number of small boilers and replacing them with more efficient automated, increased capacity heating units;

Maximum possible utilization of nuclear fuel for centralized heat supply;

Developing, for heat supply needs, nontraditional renewable energy sources and drawing secondary power resources into circulation.

One of the most important measures to increase heat supply efficiency will be mass reorganization at the first stage of the decentralized sector of the heat operations, fitting it out with modern equipment and automated devices and ensuring high-quality types of fuel.

Collaboration with the CEMA member countries in the sphere of developing electric power engineering is to be implemented through construction of nuclear electric power stations, with the technical assistance of the USSR, maximum use of the hydraulic power engineering potential of these countries and broader use for production of the electric and thermal power of local low-grade solid types of fuel. Proposals should also be drawn up for further construction of high-tension electric power transmission between the power engineering systems of the Soviet Union and the European member-countries of CEMA.

4. Nuclear and Thermonuclear Power Engineering

The USSR Power Engineering Program corresponds fully to the consistent course, pursued by the Communist Party and the Soviet Government, to establish large-scale, highly efficient nuclear power engineering.

At the first stage of implementing the program, power blocks with water-cooled reactors having a unit power of 1 million kilowatts and channel reactors with a power of 1 and 1.5 million kilowatts will be put into operation on a wider scale. Implementation will begin of directions new in principle in centralized heat supply for large cities--building nuclear power stations for heat supply, nuclear thermal electric power stations and nuclear power stations for industrial heat supply (to produce hot water and steam).

An important sphere of application of nuclear power is also power supply for relatively small, isolated consumers located in regions that are accessible only with difficulty, away from nuclear thermoelectric power central systems, and low-power nuclear power stations for heat supply.

With a view to increasing the reliability of fuel provision for nuclear power engineering, the task is being put forth of accelerating the construction of fast-neutron reactors with enterprises of the fuel cycle, which will make possible a substantial expansion in the production of nuclear fuel, and improve the use of natural uranium. To ensure a reliable future for fuel supply at the nuclear power engineering enterprises, it is specified that in the next few years a study be made of ways to improve fast-neutron reactors, as well as the practical use of thorium and its compounds in the nuclear fuel cycle.

At the first stage the scientific research and design work in the sphere of nuclear power engineering will be concentrated on solving the following problems:

Regeneration of fuel worked out in the reactors and return to the fuel cycle of incompletely burned uranium and plutonium;

Reduction in the input of natural uranium by virtue of raising the reproduction coefficient of fuel in the reactors, particularly with a transition from oxide to its more fruitful forms;

Setting up systems of fast-neutron reactors with expanded reproduction of nuclear fuel;

Setting up nuclear-technological complexes;

Working out efficient methods of eliminating nuclear electric power stations that have worked out the normative period, seeking a reliable and economical method of eliminating and burying long-lived radioactive wastes.

The high developmental rates of nuclear power, in addition to expansion of its resource base, will be ensured by building enterprises with a closed fuel cycle and further increase in the capacities of nuclear power engineering machine building and other related sectors of industry.

In the course of the second stage, reactors for power engineering-technological purposes and experimental industrial units for controlled thermonuclear synthesis should be designed. The Energy Program regards thermonuclear power engineering as one of the most probable directions for establishing a practically inexhaustible source of power supply.

Further development of scientific-technical collaboration between the USSR and other CEMA member countries in the sphere of nuclear power engineering should be of great importance in the future. The most important directions of this collaboration should be the design and production assimilation of equipment for nuclear heat supply stations, nuclear electric power stations with fast-neutron reactors and also solution to the problems of the fuel cycle in nuclear power engineering.

5. The Petroleum and Petroleum Refining Industry

The USSR Power Engineering Program calls for an increase in the extraction and production of liquid fuel in the country throughout the entire period encompassed by it. The basic part of the oil extraction will as before be ensured in Western Siberia. The oil industry in the Kazakh SSR will be further developed and searching and exploring oil deposits in Eastern Siberia and on the continental shelf of the country will be intensified. All this makes it possible to count on expansion of oil extraction in these regions.

Ensuring the necessary levels for extraction of oil and gas condensate is outlined not only by virtue of new prospected reserves, but also because of the introduction of the achievements of scientific-technical progress, particularly in the sphere of developing oil deposits, raising the oil yield of the strata and considerable improvement in the technological indicators, quality and reliability of the oil-field and drilling equipment. Envisaged

for the development of the sector is a need for the growth of capital investments, on-time supply for them of the necessary equipment and materials. Full and efficient use of casing-head petroleum gas is foreseen. By the end of the first stage the capacities for well drilling will be doubled.

The growth of volumes and rise in technical-economic indicators for drilling will to a considerable extent be ensured by carrying out a set of measures to improve drilling equipment, raise the technical level and improve the output of geophysical and control and measuring devices and also the materials and chemical reagents needed to optimize the drilling process.

The drilling rate for operational wells, by the end of the first stage, is proposed for an increase of 1.8-fold and of exploratory drilling--by 1.7-fold as compared with 1980.

Outlined is a substantial rise in the quality and reliability of oil-field equipment, above all of technical devices for the mechanized method of oil extraction ensuring the development of the most efficient types of this extraction and an increase, by virtue of these and other measures, in the between-repair work period of the wells by 2-3-fold.

Improving the development of oil deposits and increasing the oil yield of the strata are regarded in the program as the most important direction for raising development efficiency of the oil industry and reinforcing its raw material base. Measures are specified to intensify work within the framework of the scientific-technical program, estimated to 1990, of setting up and widely using in practice a set of methods and technical devices to raise the oil yield of the strata and intensify the working of oil deposits. In particular, in mind is the beginning of wide-scale industrial use of methods with a physic-chemical and thermal affect on the oil strata. Work will be continued on comprehensive automatation of oil fields and improvement of the technological systems for building up the deposits and other oil industry projects, using advanced structures.

The basic direction for the development of the oil-refining industry is an acceleration of introducing into production processes to intensify oil refining and improve the technological systems for these processes.

With a view to this, large-tonnage combined systems of oil-refining, including processes such as catalytic cracking and hydrocracking of heavy oil distillates, should be mastered and introduced into production. Measures directed toward efficient planning, as early as the first stage, of locating production capacities for oil-refining have also been outlined.

A further increase in the depth of oil-refining is linked with the use of power-intensive and expensive processes for refining oil residues. The industrial process for refining these residues comes close in power-intensity and input to the industrial process for refining coal, and may prove to be more expensive than production of liquid fuel from gas. Taking into consideration the fact that increasing the depth of oil-refining requires considerable

time for the introduction of secondary processes, substitutes for petroleum motor fuels will be compressed and liquefied natural gas, and in the future--methanol and esters obtained in gas refining, and next--coal, shale and bituminous sands.

Pipeline transport for practically all the oil extracted in the country is foreseen. Along the railroads and by other types of transport, oil which is economically inexpedient to deliver by oil pipelines, and also oil of special grades will be carried in small quantities. The development of petroleum-product pipeline transport is outlined for implementation due to establishing mainly regional systems of main petroleum-product pipelines and a separating network to the oil bases and refueling stations which provide the transport with motor vehicle gasoline and diesel fuel.

With a view to solving, in conjunction with the CEMA member countries, the problems of providing for their need for liquid fuel, the plan in mind is to develop the collaboration of the USSR and these countries in the sphere of prospecting and exploring for oil, particularly on ocean and sea shelves, and in modernizing oil-refining enterprises to intensify oil refining, setting up capacities for methanol production and the use of compressed gas as motor fuel.

6. The Gas Industry

On the basis of the resolutions of the 26th CPSU Congress, outlined as a problem of primary economic and political importance in the USSR Power Engineering Program is the rapid development of the gas industry.

A powerful raw materials base for the gas extracting industry has been established in the USSR, which makes it possible to plan a considerable rise in gas extraction and on this basis to ensure the country the necessary amount of fuel, particularly in the time required to prepare for broader use of nuclear power, development of coal extraction by the open method and use of renewable power sources.

To solve the problems set forth in the program to increase gas extraction, it has been outlined to increase the volume of exploratory and operational drilling, to intensify the capacities of specialized construction organizations, particularly in the regions of Western Siberia, and to ensure the necessary supply to the gas industry of large-diameter steel pipes and highly productive equipment to extract, process and transport gas.

The main center for gas extraction, during the entire period for which the program is calculated, remains Western Siberia. At the second stage it will be necessary to put into operation not only the large, but also the relatively small deposits of this region.

The main directions for scientific-technical progress in the sector are tied in with the solution to the set of problems regarding accelerated putting into operation and efficient working of the deposits and raising the reliability of well operation and gas field equipment. At the same time, great attention is

being paid to ensuring more complete recovery of gas condensate from the underground regions and increasing the gas yield of the beds.

Construction of large gas pipelines will be continued on a large scale, their throughput will be increased and the gas transport systems will be further developed. Wide-scale use is foreseen on the main gas pipelines of automated gas-pumping assemblies with a large unit capacity.

The long-range development of the gas refining industry is directed to raising the comprehensiveness of using gas raw material, and its intensive refining with maximum recovery of condensate, elemental sulfur, helium, ethane and other components.

The increase in the ethane production capacities will be increasingly ensured by designing a new type of enterprise --gas-chemical complexes, ensuring a high level of recovery of this extremely important chemical raw material.

Automation of the industrial processes will be further developed. By the end of the first stage the level of unit automation for comprehensive preparation of gas and tele-automation of the main gas pipelines will be over 90 percent, and of compressor stations--98 percent.

With a view to ensuring a reliable gas supply for the national economy and the population, in consideration of the seasonal unevenness in gas consumption and setting up a state reserve of gas, a further considerable broadening of the network of underground gas storages is envisaged.

Scientific-technical progress in the sphere of development of a raw materials base for the gas and oil industry will be developed in the following directions:

Improving predictions of oil and gas content, a more thorough study of the conformity to principle of formation and location of deposits on the basis of expanding the zone of comprehensive study of the earth's crust and the upper mantle, including the depths of the continental shelf and the regions of the marine depths beyond the limits of this shelf;

Determining the perspectives for assimilating nontraditional sources of liquid and gaseous carbohydrons;

Developing the geophysical and geochemical methods of seeking and exploring deep-lying oil and gas beds, and designing the equipment and instruments for these purposes;

Improving the technical devices and methods to predict the oil and gas content of the territories, increasing the speed of well-drilling, and also for geologo-geophysical and technological research in the process of drilling.

With a view to ensuring conditions for satisfying the growing demands of the European member countries of CEMA for import of natural gas from the USSR,

the possibility is foreseen of their participation in the construction of the gas pipeline from the Yamal peninsulas to the Western border of the USSR, as well as the expansion of cooperation in production for the needs of the Soviet gas industry of equipment and materials.

7. The Coal Industry

The Power Engineering Program specifies as one of the highly important measures for providing the national economy with power resources and improving the structure of the country's power engineering balance a substantial increase in coal extraction, primarily by virtue of developing the open method of working coal deposits. By the end of the second stage this method is outlined to ensure up to 56-60 percent of the total volume of coal extraction in the country, as against 38 percent in 1980.

The large fuel bases in the eastern regions--the Kansk-Achinsk and Ekibastuz fuel-power complexes, the Kuznetsk, Yuzhno-Yakutsk, Turgay and other coal basins of Eastern Siberia and the Far East.

A further rise is called for in the technical level and structural improvement of the existing available mines through modernization and technical reequipment, reducing the construction periods and assimilating new projects of the coal industry and more complete use of established capacities for the extraction and processing of coal.

Putting into effect these tasks in the program is based on increasing the capacities of the coal industry construction organizations, increasing the projects underway in the construction of new enterprises for coal extraction, accelerated development of coal machine building to provide for the sector's needs for mining, transport and enriching equipment, improvement of production technology and labor organization at the coal industry enterprises.

An extremely important role in the country's power engineering balance will be played by the Kansk-Achinsk coal basin, on the basis of which the Kansk-Achinsk Fuel and Power Engineering Complex (KATEK) is now being established. It will include open coal pits with a unit capacity of up to 60 million tons of coal a year, thermal electric power stations with a power of 6.4 million kilowatts, as well as enterprises to enrich the coal and refine it into liquid and gaseous fuel. The angles of the basin will in the future constitute the basis for the power engineering balance of the central regions of Siberia and will ensure the possibility of developing power-consuming production facilities here. Electric power, coal and the products of its refining will be transported from KATEK to other regions of Siberia, as well as to the European part of the country and to the Urals.

Very important directions in scientific-technical progress to ensure the accelerated and efficient development of extracting coal by the open method are outlined. These are the advanced growth rates of extracting coal with rotary excavators, broadening the use of transportless and hauling-stacking systems of working the deposits, the use of flow and cyclical-flow techniques

of stripping, designing and putting into production advanced new types of mining-transport equipment with high productivity and accelerating comprehensive mechanization and automation of industrial processes and enterprises as a whole.

Determined as a key direction in the technical reequipment of the coal mines are comprehensive mechanization and automation of the breakage and preparatory work and improving the system of underground transport. This is especially true of working gently sloping thin (less than 0.9 meters) and steep beds under various mining-geological conditions. Comprehensive mechanization of the work is stipulated for completion by the end of the second stage. Coal extraction without the constant presence of people in the bottoms is outlined to be brought to 10 percent of the total coal extraction volume in the mines by this time.

The fitting out of workings on sloping beds with main conveyor transport will be broadened. By the end of the second stage up to 50 percent of the total extent of these workings will be provided with this transport.

Combine tunneling of mine workings will be further developed. In the course of the first stage it will reach 50 percent of the total volume of driving the workings, and by the completion of the second stage--to 65 percent.

The relative proportion of hydraulic extraction of coal (taking into consideration its hydraulic transport) is outlined to reach, by the end of the second stage, up to 8-10 percent in the total volume of underground coal extraction.

With a view to improving the work conditions and raising the safety of them, major organizational and technical measures have been implemented to predict and prevent bursts of coal, rock and gas. A further improvement is specified for the ventilation systems and also the development of comprehensive dust elimination and implementation by the end of the first stage of degasification in all mines where it is required.

In connection with the limited possibilities of extracting coal of the clinker types, measures are provided for to expand the use of low-caking coals to obtain coke. At the same time organization of the production of special types of coke for non-metallurgical needs is outlined.

To improve the quality of the coal and increase the production of graded coal, an increase in its processing by the end of the second stage by 1.5-fold as compared with 1980 has been outlined. As a rule, at each new and modernized enterprise for coal extraction, as well as at existing mines and open pits, where this is economically expedient, coal-enriching factories should be constructed. In the 80's highly productive industrial equipment should be designed to automate the coal-enriching factories, the construction of which will begin at the second stage.

In the future, use of oil shale will increase, and the consumption of peat for power engineering purposes will be substantially reduced as early as the next few years.

Transport of the growing volumes of coal and the products of its refining will be ensured by the further development of railroad transport, as well as the establishing of pipeline hydraulic transport systems.

The intensive development of the USSR coal industry outlined by the Power Engineering Program opens up wide possibilities for collaboration with the CEMA member-countries in constructing enterprises for the processing of Kansk-Achinsk coal into liquid motor and enriched solid fuel. Further development of collaboration with the CEMA member countries is foreseen in cooperation in the production of mining, mining-transport and enriching equipment, including that achieved through joint construction of corresponding enterprises.

8. Nontraditional Renewable Sources of Power and Synthetic Liquid Motor Fuels

At the first stage of carrying out the USSR Power Engineering Program there are plans to establish a material-technical base for wide-scale use of nontraditional sources of power--solar, geothermal, wind, tidal, biomass--and also to solve the basic scientific and technical problems in the sphere of the production of synthetic liquid motor fuels from gas, coal and oil shale.

Stipulated at the second stage is beginning active drawing into the power engineering balance of nontraditional renewable sources of power and beginning industrial production of synthetic liquid motor fuels.

The most probable field of use of solar power in the national economy will be low-temperature heat supply in the southern regions of the country.

The yearly production of power resources through nontraditional energy sources will be 20-40 million tons of standard fuel by the end of the second stage. The basic part of these resources will be obtained from using solar and geothermal energy, as well as biomass.

Scientific-research and experimental-design work in the field of solar power engineering and the use of the earth's heat will be linked to a rise in the coefficient of efficiency of photoelectric transformers of solar energy, with an improvement in the systems and structures of solar units operating according to the heat cycle, optimization of solutions in the sphere of using geothermal waters to produce heat and electric power, and also with preparation of the scientific and technical base for assimilating petro-geo-thermal power resources. Raising the economic indicators of geothermal power engineering in the future will in large measure be ensured by the development and introduction into production of efficient technology for comprehensive use of geothermal waters, with the extraction of those containing useful components.

Construction of the first industrial enterprises for the production of synthetic liquid fuels from coal will be begun in the Kansk-Achinsk coal basin

at the second stage. Great attention is being paid the development and introduction of new methods of liquefying coal, making possible a considerable rise in the unit capacities of industrial units, direct processing of methanol into motor fuel, and also the use of hydrogen as motor fuel.

9. Basic Tasks of Machine Building and Other Sectors of Industry to Provide the Fuel-Power Engineering Complex with Equipment, Machines and Materials.

The USSR Power Engineering Program specifies the broadening and improvement of the production base of machine building and a number of other sectors of industry for the purpose of complete satisfaction of the demands of the fuel-power engineering complex for high-quality equipment, machines and materials.

The production base of power engineering machine building, ferrous and nonferrous metallurgy, instrument building and also of other sectors of industry that provide nuclear electric power stations with equipment, machines and materials will be further developed. By the end of the first stage, the construction, expansion and modernization of 70 machine building and ferrous metallurgy enterprises should be carried out.

The technical reequipment of power and electric machine building will be directed toward the development of specialization of production and improvement of its structure, a rise in the technical level, reliability and operating life of machines and equipment and a reduction in their metal-intensiveness.

There should be provision for the design and manufacture in the necessary quantities of high-efficiency powerful steam and hot-water boilers for peak and regional boiler-houses operating on solid fuel, with a high degree of catchment of harmful wastes.

The electrical engineering industry will receive accelerated development. At the second stage the necessary scientific-technical potential will be established for the production of electrical equipment on the basis of the effect of superconductivity, and machines and units for thermonuclear electric power stations and also for units operating on solar power.

Measures have been outlined to provide enterprises for power engineering and mining machine building with ferrous and nonferrous metals and blanks made from them, of high quality, in the required amount and assortment.

The building materials industry will begin production of new industrial thermo-insulation materials for heating networks, as well as for buildings and constructions. The chemical and petrochemical industry will master the output of plastic pipes for central heating networks, and the nonferrous metallurgy industry--materials for the electrical engineering industry.

The outlined construction of electric power transmission lines with a voltage of 1.150 kilovolts and 1.500 kilovolts will be ensured by the corresponding development of production of the necessary building structures, insulators, transformers, switches, cable and other items.

To provide the coal industry with equipment at the first stage, the construction of new plants and modernization of a number of existing plants for the production of equipment to extract coal by the open and underground methods has been specified. The production of new models and modifications of open-cut power shovels, hydraulic excavators having a bucket with a capacity up to 20 cubic meters (in the future--with a capacity of 30-40 cubic meters), walking draglines with a bucket capacity of 75-120 cubic meters and arms up to 100-120 meters in length and powerful conveyors with a belt up to 2.5 meters wide will be mastered. At the first stage there should be constructed an assembly with a productivity of 12,500 cubic meters an hour to perform the stripping work. Production will be expanded of improved equipment for the mines--breaking and tunneling assemblies, tunneling combines, belt conveyors, units for shaft drilling and other equipment.

Material-technical provision for the development of the oil, gas and oil-refining industry is based in the program on the modernization of existing enterprises and the construction of new ones for the production of high-strength drilling, casing and pump-compressor pipes with advanced designs, primarily in cold-resistant and corrosion-resistant use, as well as large-diameter pipes with plant exterior and interior insulation for transporting gas and pipes for oil- and product pipelines. Production will be organized of spouting accessories and well equipment in corrosion-resistant use, of block-unit automated modules with increased productivity for the extraction, preparation and processing of gas and condensate, automated block-unit gas-pumping units with an efficiency coefficient of 34 and more percent. There will be an increase in the production of solid alloys and items made from them for the output of advanced types of drilling bits and boring bits.

Completion of the expansion and modernization of a number of enterprises of chemical and petroleum machine building is outlined in the next few years.

Provided for in the machine building and ship building sectors is the design of equipment, sea-going vessels, self-hoisting drilling rigs, instruments and other technical devices for the extraction of oil and gas on the continental shelf, ensuring well drilling to a depth of up to 6.500 meters with a sea depth up to 300 meters, as well as for the laying and repair of underwater pipelines.

The chemical and microbiological industry will produce in the necessary amount and assortment reagents for drilling mud, increasing the oil yield of the strata, combating corrosion and also combating salt and paraffin formation when extracting oil.

Provision is made to increase production of new types of gas-compressor and oil-pumping units with gas-turbine drive and electric drive and special electric motors, including submersible, as well as systems for automatic control and regulation of their operation.

With a view to increasing the efficiency of seeking, exploring and working oil and gas deposits provision is made for the output in the necessary quantity of control-measuring and geophysical instruments and equipment at the modern

technical level, including nonexplosive seismic sources of oscillations, units for direct search for oil and gas and digital well equipment.

In machine building and instrument building, in the next few years it is outlines to solve the problems of ensuring mass output of efficient power-saving equipment and technical devices to adjust the consumption of power resources and monitor their efficient and economical expenditure.

10. The Economic Efficiency of the Fuel-Power Engineering Complex and Capital Investments Allotted for Its Development

An increase in the production of power engineering resources under the increasingly complicated conditions of extraction and transporting of fuel, and also of the natural leaving of production capacities at worked-out deposits is tied in with the growth of capital-intensiveness of the fuel-power engineering complex. The proportion of capital investments needed for the outlined USSR Power Engineering Program for the development of the power-engineering complex is estimated in the next two decades as 20-22 percent of the total volume of capital investments in the national economy. In connection with the long normative duration of establishing new production capacities in the sectors of the fuel-power engineering complex, an increase in capital investments is specified to ensure the necessary stockpile in construction of projects for the fuel industry and power engineering.

One of the most important tasks for scientific-technical progress in the sectors of the fuel-power engineering complex is specified by the program as stabilization in the future of the relative proportion of capital investments in these sectors in the total capital investments in the national economy.

In restraining the growth of expenditures necessary for the development of the fuel-power engineering complex, a large role is assigned to the related sectors, and above all to machine building and ferrous metallurgy.

Putting into effect the measures of the program for the development of the fuel-power engineering complex, despite the growth of its capital-intensiveness, ensures a high national economic effect. About half of the assigned effect is given by the implementation of measures for energy conservation, and about one-fourth--by the replacement of organic fuel with nuclear and hydraulic energy. In addition, the effect is ensured by further electrification of the most labor-intensive technological and transport processes, expansion of the use of electric power in everyday life, further development of centralized heat supply and drawing into the economic turnover nontraditional sources of energy.

The total saving of the national economic input ensured by carrying out the program is approximately 1.5-1.8-fold higher than the capital investments necessary to implement the measures stipulated by it.

Along with the saving in national economic input, the outlined development of the fuel-power engineering complex ensures a substantial saving of labor

resources, mainly by virtue of raising the electric power-worker ratio in industry, construction, agriculture and transport, and also as the result of further centralization of electric and heat supply.

The USSR Power Engineering Program in the long-term perspective, just as the USSR Food Program in the period until 1990, is an important unit in the important complex of measures implemented by the Communist Party and the Soviet State, for a steady growth of the workers' well-being and rise in the might of our Native Land.

Further development of the fuel-power engineering complex, improvement of the power-engineering balance, a rise in labor productivity with the production of power-engineering resources on the basis of introducing the newest achievements of science and technology, efficient use and economic expenditure of fuel and energy are the most important goals of the Party, Soviet and economic organs, trade union and Komsomol organizations and of all the workers of our country.

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A brochure with the text of "Basic Premises of the USSR Power Engineering Program for the Long-Range Perspective" was issued in Politizdat.

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